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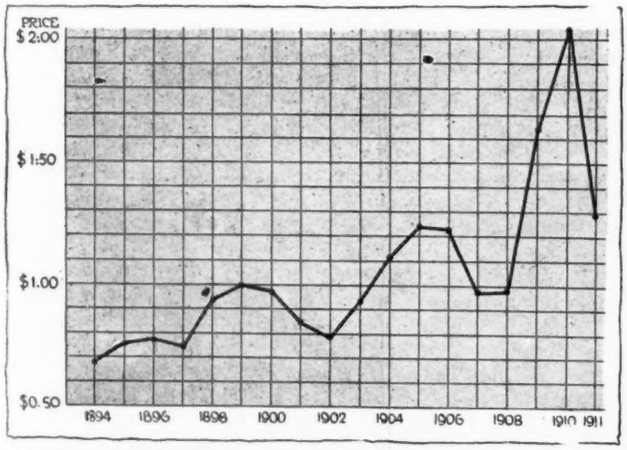
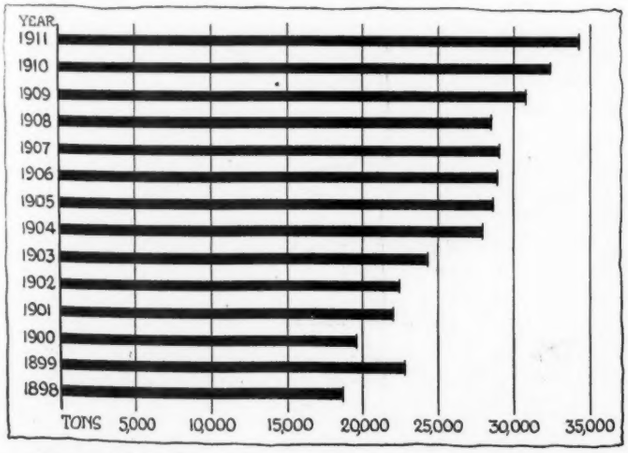
The AUTOMOBILE

World's Rubber Production On Verge of Vast Increase

With Extension of Plantations to Prospective Limit of 2,000,000 Acres and the Activity to Exploit the Virgin Fields of Wild Rubber, Prospects Favor Larger Yields



Curve shows how the average price of up-river fine has varied since 1894. The apex shown in 1910 resulted from the extra demand exerted by the automobile industry



Consumption of rubber in the United States between 1898 and 1911 in long tons, indicating the influence of the automobile industry on the amount required

Synthetic Rubber a Chemical Success, But a Remote Possibility as an Element in Commerce

RUBBER is grown in every tropical country in the world. In some of the states that lie within the tropics the topography is mountainous as a general thing; in others there are deserts, but from a broad viewpoint, there is some land fit for rubber raising in every land that lies within the torrid zone and some rubber grows in each.

On the borders of the tropics there is also considerable rubber produced, but as a factor in the industry it is of small importance. This year the total crop will approximate 90,000 long tons of 2,240 pounds; some excellent authorities state that it will be nearer 100,000 tons. The former figure is the one most generally adopted by the statisticians.

Of the world's production in 1912, the Amazon Valley will be represented by 40,000 tons, or about 45 per cent. of the total. All of this is denominated wild rubber, despite the fact that in Brazil there are a few small plantations, the oldest of which is 14 years old. These plantations are virtually botanical gardens and experimental stations.

The productive rubber territory in the Amazon Valley has been scratched so far, but that is about all. Back of the navigable rivers, which furnish waterways 32,000 miles long, or more than the distance around the earth, the main artery of which, the Amazon proper, and its direct western branch reach from Para to the foothills of the Andes, over 2,000 miles, there is a wilderness that rarely has been penetrated by explorers and never has felt the influence of exploitation.

As it has been proven on the rare occasions when the explorers have traversed some of these jungles, the rubber forests now being drawn upon represent a small part of the total existing supply. In the wide territory opened up by the new Marmore-Madeira Railway in the remote southwestern part of Brazil and across the border of Bolivia, the potentialities of the Amazon supply will be much increased. No man can estimate with anything like exactness the extent of the rubber fields in Brazil and its surrounding states, but the proof of the fields and forests is represented by 40,000 long tons of the product.

It is said that the collection of rubber means the cost of a

human life for each 2 tons marketed. At that rate the mortality in the Amazon collections would amount to 20,000 human lives a year. The simple fact that rubber collection is so deadly explains the reason for the lack of definite statistics covering the extent of the field. Unhealthful conditions, lack of sanitation and the ignorance of the labor employed are the chief reasons for this appalling mortality.

The Marmore-Madeira Railway project is by no means the only great transportation measure under way in Brazil. There are numerous shorter and less important lines under some stage of construction and an immense activity has been noted this year in highway improvement and the betterment of the waterways.

Brazil is alive to the fact that her industry in rubber now has competition in the markets of the world and realizes that a commercial basis must be reached in order to hold the lead she has always enjoyed in the rubber industry.

The law of January 5, 1912, which provides for remission of import duties, relaxation of export duties, bonuses for production of rubber and its manufactured products as well as supplies for the great army of labor, experiment stations and numerous other factors to develop the industry and bring about a greater production, which may cost in cash outlay as much as $15,000,000 a year, is already at work. With the new territory opened, new land planted and old forests conserved, the production of the Amazon Valley will probably increase immediately and it is predicted that it will easily reach 60,000 long tons a year within 5 years.

The chief rival of Brazil is the British colonial plantation rubber, located in Malaya and Ceylon, the production of which will be in the neighborhood of 20,000 long tons this year, some say 22,000 tons.

Both Ceylon and Malaya have been covered in some detail in previous issues of THE AUTOMOBILE, but it may be said that the yield of Malaya will be about 15,000 tons and that of Ceylon 5,000 tons this year.

The wild African rubber is not a factor in the automobile industry, but in the colonial possessions of various European nations on both coasts the plantation idea is being developed with much success. The German, Dutch, French and British colonies and the protectorate of Belgium are trying it. The yield to date has not been considered an important factor, but there is a total acreage of about 10,000 that is being extended with rapidity. The trees are mostly immature, but appear favorably in comparison with other plantation trees. The seeds from which these trees are grown comes from Ceylon and Malaya.

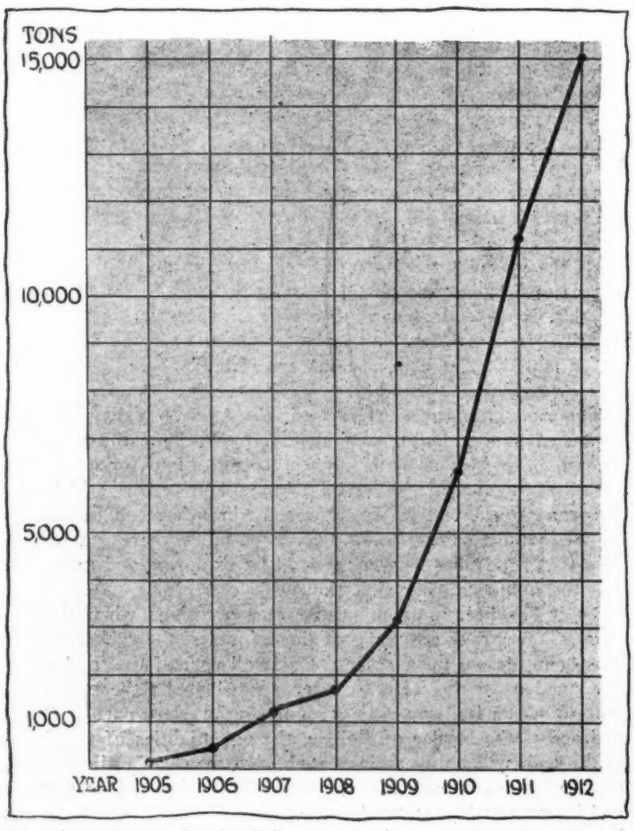
The native African rubber is derived from vines very largely.

Mexico and Central America are not important factors in the production of rubber for automobile use, but the fields of Mexico are of large extent, the acreage being estimated at 100,000, the eventual yield of which will be enormous. The Central American rubber is largely from the castilloa. Guayule is derived from a weed related to rubber, but bearing only a remote resemblance to it. Guayule production in 1911 was about 9,000 tons.

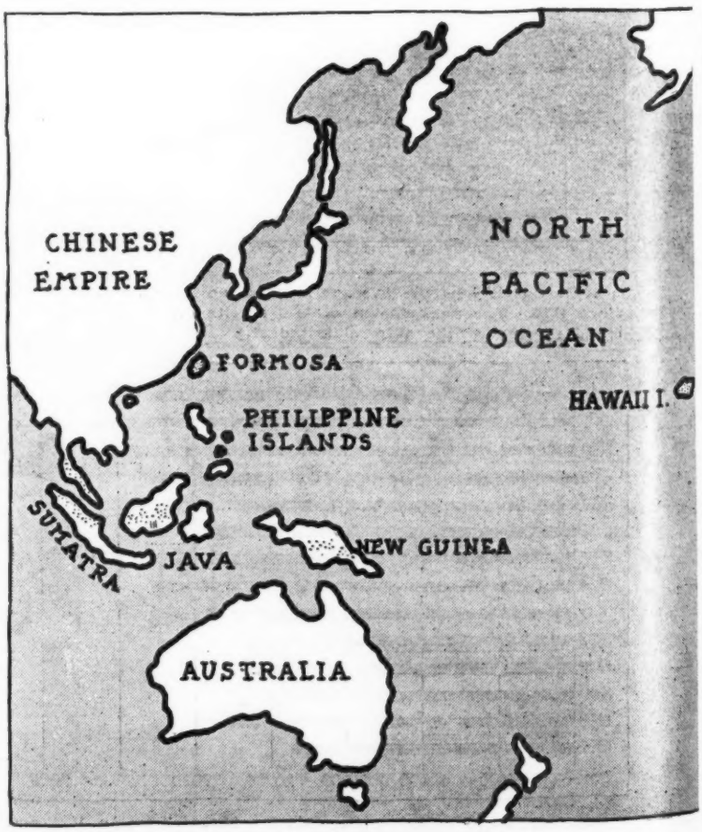
Burma, India, Borneo, New Guinea and the great islands of Sumatra and Java and some of the lesser islands of Oceania produce some rubber now and when their plantations are in full development the amount will be vastly larger. The native rubber is of no account for automobile purposes, but in each section the hevea is being introduced and in a few the castilloa, ceara and other rubber trees are being planted.

As Henry C. Pearson, editor of the *India Rubber World*, said recently in an editorial in that journal, any attempt to estimate the future rubber production of the world in definite terms is sheer vanity. Nevertheless, it may be said with conviction that unless a general blight falls upon the plantations, or somebody invents a process of producing synthetic rubber as good or better than present varieties of crude rubber at less cost, not only will the world's yield be vastly greater next year than in 1912, but the increase will continue indefinitely.

It is said that the plantations of the world embraced about 1,000,000 acres in 1912. It is planned to increase the plantations



How production of plantation rubber has increased in Malaya



Distribution of the world's rubber fields extends throughout

of Malaya and Ceylon to 1,350,000. If the other sections expand to their reasonable limit, the total acreage of the world's plantations will reach 2,000,000 within a few years, taking no account of the vast projects to cultivate rubber in Brazil.

The plantation industry is too young to tell where the age limit will prove effective in checking the supply. The oldest trees under cultivation are the largest producers, the record being about 80 pounds of dry rubber a year from a 36-year old tree in Ceylon 16 miles from Colombo. So far the rule has been that the older they are the better they yield.

It is likely that a yield of 10 pounds a year from each tree in the plantation areas will be reached in time and if the proportionate yield increases at anything like the rate shown by some of the older trees in Ceylon and Malaya, it is not unlikely that a general average of 25 pounds or even considerably more may be reached at no very distant date. If the trees prove to be as productive as the one in Ceylon that yields 80 pounds a year for 3 successive years, the average yield of plantations where the trees are of similar age to the record holder might reach 50 pounds.

If all that is true and there is an average of even 100 yielding trees to the acre, the total production of the world may reach the incomprehensible total of 15,000,000,000 pounds, or about 7,000,000 long tons.

Among the newer plantation undertakings the cultivation of rubber in the Philippines, particularly in the Island of Moro, by Dr. Walter Strong and others, and on the Hawaiian Island of Maui and the Japanese protectorate of Formosa have proven successful. So far the yield has been small in the aggregate, but the promise in each field is large.

In Moro Dr. Strong has brought the hevea to a highly productive stage in a small way and has produced some rubber that is pronounced excellent by those in position to judge. The land available for rubber culture in the Philippines is very large in acreage and in the southern part of the archipelago, south of the typhoon belt, the climatic conditions are ideal. In the Philippine islands the labor problem is much nearer a solution on reasonable lines than it is among the various British colonies.

In Hawaii, while the topography of the country is rough, especially on Oahu and the main island of Hawaii, there are many stretches of country 5 miles long that may prove ideal rubber plantations. The rubber that has proved most successful so far in the experimentation is the ceara type. The commercial shipments this year will not be over 6 tons, but in due course the yield will be vastly increased. About 3,000 acres have been planted in rubber.

The Formosan experiments are rather new and so far are inconclusive.

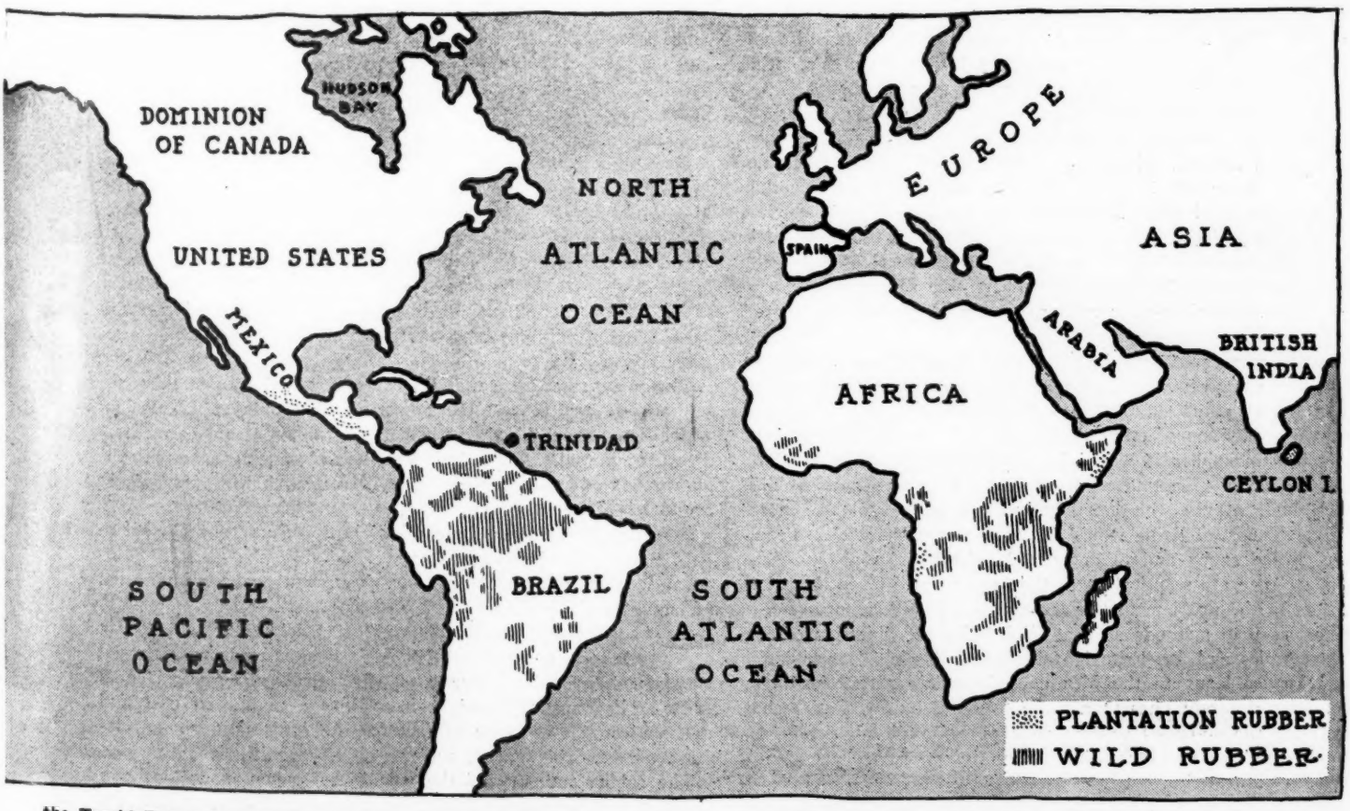
In the West Indies, Trinidad already has taken up the industry with vigor, and it is said that the valleys of Cuba afford the ground work for plantations growing some varieties of commercial rubber. The extent of the present acreage under plantation rubber may be estimated about as follows:

Malaya	600,000
Ceylon	150,000
Mexico	100,000
Africa	10,000
Elsewhere	100,000
Total	960,000

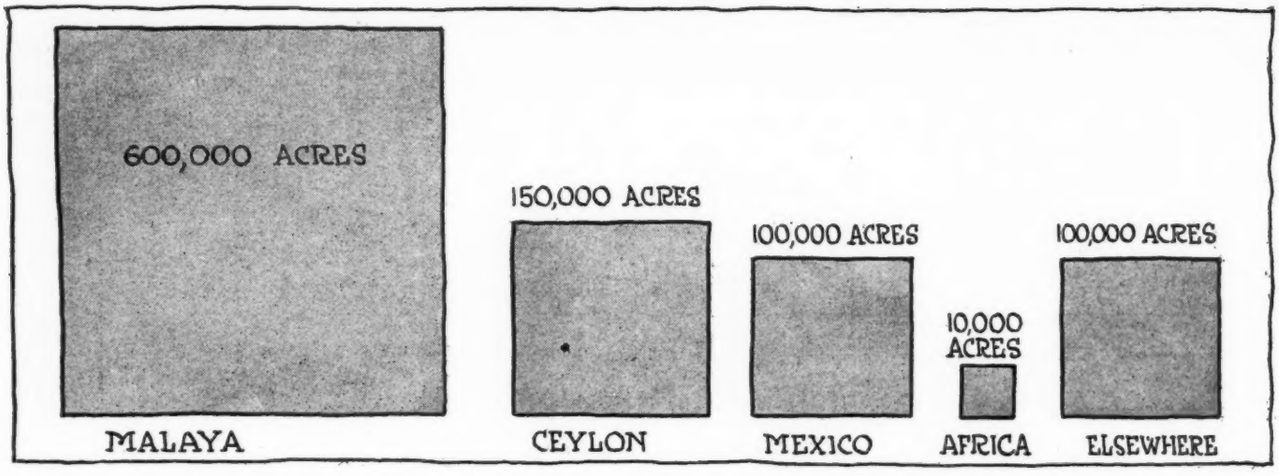
There is not a remote chance for exactness in estimating the extent of the wild rubber fields. The Amazon Valley is over half as large as the territory of continental United States and the rubber country of Africa compares with it in size. The islands of the East Indies increase the total of wild rubber lands enormously.

Aside from wild and plantation rubber another possible factor of future supply is synthetic rubber. There has been much said on the subject, but so far the actual, tangible results as affecting the industry have been negligible.

Synthetic rubber was discovered in 1892 by Professor William Tilden, of Mason College, Birmingham, England, by the sheerest chance. He had prepared a number of experimental combinations of isoprene, a derivative of turpentine, and hydrochloric acid. He found a substance resembling rubber in one of the tubes, but had failed to enumerate the exact constituents of the



the Torrid Zone wherever climatic conditions are favorable to the growth of the latex-producing plants, trees and vines



Acreage of the world's plantations, showing a total of about 1,000,000 acres under cultivation, one-third of which is now producing

experiment and despite years of labor failed to produce any more rubber.

With that much as a basis, the chemical science of the world has been busy at times ever since and periodically announcements have been made that synthetic rubber was an accomplished fact and that the wild and plantation industries better prepare to go out of business.

Some real progress, however, has been made within the past 3 years. Two chief groups of scientists are busy at present to commercialize their discoveries. The British group, headed by Dr. William H. Perkin, professor of chemistry at Victoria University, Manchester, believes he has the real solution. It was acknowledged that the use of isoprene, derived from turpentine, as a basis, while chemically proven, was too expensive ever to hold the promise of competing with Malayan rubber at a cost of 25 cents a pound. Professor Fernbach, of the Pasteur Institute, observed that it was possible to ferment starch or even sawdust to obtain butyl alcohol and acetone at less than present market prices, and to derive from such alcohol so-called fusel oil, which Dr. Perkin insists may be substituted for turpentine or other isoprene in the commercial production of rubber.

The chemical steps required, according to Dr. Perkin, as set forth in a statement to the *India Rubber World* are as follows: Take ethyl alcohol, which may be easily oxidized to acetaldehyde; condense this by means of potassium carbonate to aldol; convert the aldol (quantitatively) into butylene glycol; convert the butylene glycol into dichloride. Then pass this over soda lime and produce butadiene. This substance treated by the sodium method yields synthetic rubber. He says that the product is a five-carbon-atom rubber, closely approximating natural rubber.

The German scientists do not regard the British method very seriously as a commercial, or even as a chemical accomplishment. They point out that in order to produce sufficient starch for the production of ethyl alcohol needed in making 10,000 tons of synthetic rubber it would be necessary to use the yield of 1,000,000 acres of potatoes. Even if potatoes were not prohibitively high in price, the demands on the land due to the general rise in the cost of living would forever bar such use. As to sawdust, grape sugar and other possible elements in alcohol production, they are sceptical as to the sawdust and place the other factors in the problem in the same category with potatoes.

The German methods used at Kiel under the direction of Dr. Carl Harries and Dr. Fritz Hofmann, at Elberfeld, vary widely. Dr. Harries leans to the idea of polymerizing isoprene along somewhat different lines than those followed by Dr. Perkin, but says that the so-called sodium rubbers, although physically resembling rubber and susceptible to vulcanization, are not identical with natural rubber.

Dr. Hofmann takes coal as a basis for the production of the isoprene used in his process. He uses heat in reaching the final result.

That synthetic rubber is a scientific fact of importance to the automobile industry is proven by the recent delivery by Dr. Carl Duisberg in New York of a statement showing that a set of automobile tires had been made from the product of the Elberfeld factory which were used for 4,000 miles without puncture or serious signs of wear.

The most advanced scientists and those most closely identified with the production of synthetic rubber do not believe that it will appear on the market in the immediate future.

Two sets of tires have been made, one of which was presented to His Imperial Majesty of Germany. These eight tires represent the actual commercial accomplishments of the scientists during 5 years' labor.

At present rates of cost, the raw material needed to produce a pound of synthetic rubber has been estimated all the way from 5 cents to 50 cents. The labor, factory expense and overhead are uncertain items. If the product demands sufficient material to shorten the world's supply in any particular, bounding prices are inevitable for the particular element on which the demand is exerted.

Thus, even the cost of material is an intangible quantity.

Based upon present prices of material, the synthetic rubber makers claim that they will be able to supply the rubber market at a level under 60 cents. Some estimates are considerably lower than that figure.

But the activity of the inventors was spurred and stimulated by the high prices of 1910, and while their efforts have continued toward a solution, there have been only half-hearted attempts at production on anything that resembles a commercial scale since prices fell.

The scientists realize that they have arrayed against them the millions of capital and the power of the Malayan plantations which can produce high-grade natural rubber at a big profit at 25 cents a pound. They admit that their big fight will be with the plantations and that the victory will rest with the party whose product is cheapest.

Figuring the birth of the synthetic industry at 1909, the scientists state that when it is 36 years old, like the plantation industry at present, it will occupy a prominent position in the list of commercial factors of the world.

As it applies to the automobile industry, it may be said that in order to become an important factor, synthetic rubber must equal natural rubber at less price or excel natural rubber at an equal price. The question resolves itself into a matter of cost and that subject is a question of fact for the future and not an element of debatable nature under present conditions.

The rubber industry of the world has grown marvelously in the past half century. While rubber has been known for 400

years and has been used more or less for nearly a century, it really had its birth in 1839 when Charles Goodyear, a poverty-stricken scientist, happened to drop a handful of crude rubber mixed with sulphur on a hot stove and the process of vulcanization began.

Brazil in 1840 had a few rude manufactures and even prior to that date exported small lots of rubber. In 1827 the exports amounted to 31 tons.

To give some idea of the present extent of the industry, the following table of estimates covering the 1913 demand for rubber has been prepared by the Rubber Plantation Investment Trust:

Country	Estimated needs in tons
America	47,500
Great Britain	15,000
Germany	15,000
France	10,000
Russia	7,000
Belgium	1,500
Other countries	7,000
Total	103,000

Against this demand and compared with the product of 1912, which has been estimated roundly at 90,000 tons, the increase of 13,000 tons will have to be accounted for largely by the natural increase of the plantations.

The estimates made by experts are all more or less uncertain and vary widely. For instance, despite the fact that the plantation rubber auctions in London will dispose of over 20,000 tons of rubber in 1912, the more conservative experts only place the 1913 estimate on plantation production at 28,500 tons. Leonard Wray, Edward G. Salmon and others connected with the British plantation industry state without reservation that the rate of increase noted is much below the probable results.

Mr. Wray submits the following figures on Malaya's production that seem to indicate a vastly larger yield than the figures of the experts would appear to show. Mr. Wray's figures are as follows:

EXPORTS

Year	Tons
1905	130
1906	420
1907	1,020
1908	1,580
1909	3,010
1910	6,420
1911	11,120
1912	15,000

The acreage in Malaya in 1911 was 542,000, but the yield of 11,120 tons was from plantations comprising only 99,230 acres which had been planted by 1906, as it requires over 4 years to develop the trees to the point of yielding. An acreage of 179,227 is bearing in 1912, and it is estimated that the exports will reach the high total of 17,800 tons. The 1913 product of Malaya will be based upon an acreage of 241,138, and it is easily probable that it will run above 25,000 tons. With Ceylon, which has about one-third of the size of the Malayan fields under cultivation and which is increasing in about the same general proportion, the total yield of these two countries should be about 34,000 tons and other plantation projects will certainly increase the total quite materially.

Despite the calculations of experts it is not unlikely that the plantation yield of 1913 will be close to 37,000 tons.

According to the figures submitted, the whole product of South America will be only 39,000 tons in 1913. Just how that figure is reached is mysterious as no man can say what will come out of the Brazilian jungle. In 1911 the shipments from the Amazon Valley equaled 38,000 tons. In 1912 the Amazon shipments are estimated at 39,000 tons, or more. Neither figure covers shipments of manicoba rubber or any product outside the Amazon Valley. These elements are estimated at about 2,000 tons for 1912. Thus the estimate of 39,000 tons as the production figure for South America in 1913 seems too low. The working of the new law in Brazil will undoubtedly lead to some increase from the Amazon country and many experienced rubber men believe that 40,000 tons is none too much to expect from that section. With that as a basis, the figures of the Brazilian industry indicating at least 42,000 tons for 1913 do not seem to be too large.

The tabulation referred to is as follows:

ESTIMATED PRODUCTION OF 1913

Country	Tons
South America	39,000
Plantations	28,500
Africa	15,000
Central America	5,000
Other sources	3,500
Total	91,000

The table above does not specifically classify several of the newer fields, making no particular mention of Mexico, lumping that country with Central America. The apparent difference of 8,500 tons of plantations and 3,000 tons from South America may be augmented by an item of at least 2,000 tons not mentioned at all in the table. With these additions the total as above would be increased to 104,500 tons as the probable yield of 1913.

The consumption of rubber in the United States by years since 1898 is as follows:

Year	Consumption in Tons
1898	18,623
1899	22,674
1900	19,532
1901	22,327
1902	22,480
1903	24,345
1904	27,300
1905	28,046
1906	28,483
1907	28,634
1908	28,050
1909	30,669
1910	32,385
1911	34,152

In addition to the total of 1911 there was an item of 8,091 tons of guayule imported from Mexico.

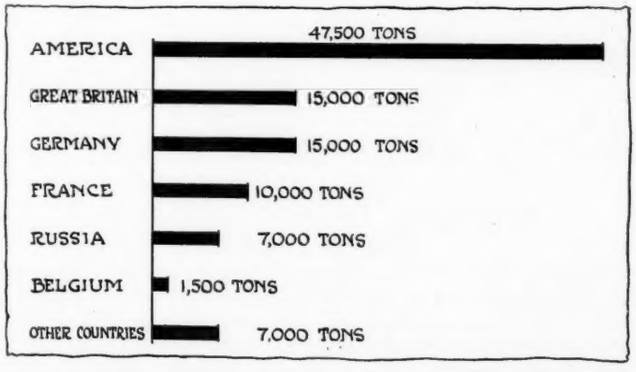
The influence of the automobile industry may be read between the lines of the table above. In 1900 the domestic consumption of rubber was only 19,532 tons and there was no material demand from the automobile industry. In 1911 the consumption was 34,152 tons and the difference between those quantities represents approximately the use of rubber in the United States for automobile purposes, or 14,618 tons in 1911. Of course, other industries have increased in volume during the period covered by the figures, but reclaimed rubber and guayule probably cover most of the additional demand made by them upon the regular supply.

Certain it is that with the bulge of prices noted in 1910 and before and after the market reached its crest at $3.10 a pound, the consumption in other lines than tires was checked at the exorbitant levels.

The tire requirements for 1912 will probably reach 15,500 tons and in 1913 17,000 tons.

The inadequacy of supply at the time of sharpest demand from the automobile industry, together with coincident elements of manipulation by speculators may be seen in the accompanying table showing price fluctuations. Of course, it should be remembered that the grade quoted is up-river fine, and that while

(Continued on page 770)



Needs of rubber-consuming countries shown for 1913 in long tons

Trade News of the Week

Federal Rubber Doubles Capitalization—Gramm Dispute Settled—U. S. Motor Reorganization Details

Crude Rubber Higher in Inactive Market—Ohio Creditors Differ as to Plans of Procedure

MILWAUKEE, WIS., Oct. 14—The Federal Rubber Manufacturing Company, Milwaukee, Wis., and Cudahy, Milwaukee county, has increased its capital stock from $1,000,000 to $2,000,000. Since January 1 the factory has been working night and day and the actual sales have exceeded the pre-season estimates by more than $400,000. During the past season the company has done extensive construction and improvement work, valued at nearly $500,000. A principal improvement was the construction of a new central power, lighting and heating plant aggregating 3,500 boiler horsepower. There are employed at this time 1,750 men in the manufacture of pneumatic tires, solid tires and rubber goods of all kinds. B. C. Dowse is president; H. A. Githens is vice-president and Richard Ward occupies the position of secretary and treasurer.

Gramm Dispute Settled Out of Court

TOLEDO, O., Oct. 14—The difficulties between President John N. Willys, of the Willys-Overland Company, and A. L. White and W. T. Agerter, over the transfer of controlling stock of the Gramm Motor Truck Company, at Lima, have been amicably settled. Mr. Willys had brought suit, charging misrepresentation of the value of stock. The payment of all bonded indebtedness of the Lima plant has been announced and also the intention to double the capacity of the plant.

Findlay Company Again Defendant

TOLEDO, O., Oct. 14—The Findlay Motor Car Company, and its receiver John M. Barr, John Von Stein and the Farmers Bank Company, of Jenera, in Hancock County, have been made defendants in a suit brought by William C. P. Rhoades. Mr. Rhoades seeks to recover judgment on a promissory note of $5,000 asking for the foreclosure of a mortgage on land in Monclova township.

Crude Rubber Works Higher

Crude rubber has worked back to a basis of $1.10 a pound for up-river fine with little or no apparent reason for the upward trend. Consumers have not been aggressive in bidding for the firmly held but liberal supply and the trading on the advance has been somewhat smaller than was noted last week. On the other hand the sellers have not been liberal in conceding anything in order to make trades. Imports in New York are well up to the average. While pale crêpe from the plantations remains steady at the former figures, approximating $1.16 1-2 a pound, bales and sheets have yielded about 1 cent a pound.

Reorganizing United States Motors

Announcement of the reorganization plan to be used in rehabilitating the United States Motor Company along the lines of the article published in these columns last week has been made and progress toward completing the organization will come next. Under the plan adopted by the creditors the matter will be taken out of the hands of the United States District Court as soon as the details have been worked out on a satisfactory basis.

The first step to be accomplished will be to formulate and send out to those interested as creditors and stockholders a legal notice of the agreed plan. Then will follow the call for deposits of the stock certificates and the issuance of new certificates under the schedule as announced.

The financial part of the plan will be carried out under a system of underwriting, the details of which have been completed but not announced.

There has been much talk about the personnel of the new company but no decision has been reached as to who will lead. W. E. Strong, who has acted as chairman of the board since the extension of credit last June has been asked to remain with the new organization, but in exactly what capacity has not been outlined.

Ohio Creditors Differ as to Plans

CINCINNATI, O., Oct. 14—There is apparently a sharp division among the creditors of the Ohio Motor Car Company which is now in the Court of Common Pleas under insolvency proceedings. One committee of the creditors has issued a statement recommending that the plant be sold on the block as quickly as possible and urging the creditors to bring pressure to bear to

Automobile Securities Quotations

General Motors preferred sold ex-dividend Tuesday, the books being closed for payment of the regular dividend of 3 1-2 per cent. This stock has paid $8 a share during the past year, but the extra 1 per cent. was not in the nature of an extra dividend, being merely in the nature of a readjustment of the dividend period so that the bond coupons and the preferred dividend should not fall together. Goodyear common skyrocketed fifty points on bidding by insiders, but little stock came out as a result. The annual meeting of the company does not take place until December, but it has been pretty well understood that it will reveal astonishing conditions. The remainder of the list was irregular, with Goodrich, International and White lower and the rest of the list, where any change was noted, fractionally higher. Trade as whole was small in volume and without particular trend. Whatever movement appeared in the securities of United States Motor was downward, the Street apparently awaiting for a hint as to the intentions of the financial powers with regard to the reorganization. The table follows:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	150	175
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	100	102
American Locomotive, common	34½	35	42	43
American Locomotive, preferred	105	105½	107	108
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., com	6	10	13	15
Consolidated R. T. Co., pfd	10	20	50	60
Diamond Rubber Company	..	..	..	..
Firestone Tire & Rubber, com	178	185	270	275
Firestone Tire & Rubber, pfd	108	110	106	107½
Garford Company, pfd	..	..	99	100
General Motors Co., common	37	38	34	36
General Motors Co., preferred	74¼	77½	74½	77½
B. F. Goodrich Co., common	*238	*242	†72	†73
B. F. Goodrich Co., preferred	*118	*119	†106	†106½
Goodyear Tire & Rubber, com	225	235	375	380
Goodyear Tire & Rubber, pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	92
International Motor Co., com	..	..	18	21
International Motor Co., pfd	..	..	78	81
Lozier Motor Company	..	..	43	45
Miller Rubber Company	..	..	130	140
Packard Motor Company, pfd	104	106	105½	107
Peerless Motor Company	..	..	116	120
Pope Manufacturing Co., com	40	50	35	37
Pope Manufacturing Co., pfd	73	75	73	75
Reo Motor Truck Company	8	10	..	23
Reo Motor Car Company	23	25	..	10½
Studebaker Company, common	..	..	40	42
Studebaker Company, preferred	..	..	94	95½
Swinehart Tire Company	..	..	99	100
Rubber Goods Company, com	85	95	100	..
Rubber Goods Company, pfd	100	105	105	110
U. S. Motor Company, common	28	30	1	1¼
U. S. Motor Company, preferred	69	70	3¼	4
White Company, preferred	..	..	105	108

*Old. †New.

have the whole manufacturing force discharged instantly. This report is signed by J. S. Monroe, E. J. Hess and C. M. Stadelman.

The other report takes a rosier view of the matter. It denies the accuracy and good intent of the other committee and states that a careful appraisement having been made, it was found that the plant is worth about $200,000, not including bills and accounts receivable, good will and stock holdings in other corporations. That figure is over $20,000 greater than the total liabilities, according to the committee.

The committee urges the creditors not to take any action until thoroughly informed of the facts. This report is signed by C. F. Pratt and A. E. Schafer.

In the meantime the receiver, E. G. Schultz, has completed and sold one car and several Breeze buggies.

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Crawford Takes Dyer License

The Crawford Automobile Company, of Hagerstown, Md., has been granted a manufacturing license under the Dyer transmission patents. The company is one of the veterans of the industry, but has never approached major size in comparative production.

Market Changes for the Week

A number of important changes took place in the market the past week, the most important being the drop in lead and tin and the gain in Bessemer steel. Tin fluctuated throughout the week, closing at $4.90 per 100 pounds, a loss of $.10. Lead dropped $.02 1-2 on Saturday and remained at that figure to the end of the week, closing at $5.07 1-2 per hundred pounds. Bessemer steel experienced a gain of $.50, rising to $27.00 a ton on Friday and remaining at that price the rest of the week. Antimony remained at $.09 per pound throughout the week, and beams and channels were constant, closing at $1.61. Rubber rose to $1.09, experiencing a gain of $.02, due to the inactivity of the sellers. Copper electrolytic rose $.00 1-10, closing Tuesday at $.17 1-2. Copper lake remained constant throughout the week, selling at $.17 5-8. Open-hearth steel remained constant, closing at $27.50. The cottonseed oil market was decidedly weaker Tuesday, closing at a loss of $.15. The weakness in lard and the decline in cotton were both responsible for considerable selling pressure, causing the drop. The prices of petroleum and gasoline remained unchanged.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.09	.09	.09	.09	.09	.09	.....
Beams and Channels, 100 lbs..	1.61	1.61	1.61	1.61	1.61	1.61	.....
Bessemer Steel, Pittsburgh, ton	26.50	26.50	27.00	27.00	27.00	27.00	+.50
Copper Elec., lb.	.17⅞	.17½	.17½	.17½	.17½	.17½	+.00 1/10
Copper Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.....
Cottonseed Oil, Oct., bbl.....	6.44	6.45	6.45	6.45	6.30	6.29	—.15
Cyanide Potash, lb.....	.19	.19	.19	.19	.19	.19	.....
Fish Oil (Menhaden) ..	.33	.33	.33	.33	.33	.33	.....
Gasoline, Auto, 200 gals. @...	.21	.21	.21	.21	.21	.21	.....
Lard Oil, prime..	.85	.85	.85	.85	.85	.85	.....
Lead, 100 lbs....	5.10	5.10	5.10	5.07½	5.07½	5.07½	—.02½
Linseed Oil.....	.64	.64	.68	.64	.64	.64	.....
Open-Hearth Steel, ton.....	27.50	27.50	27.50	27.50	27.50	27.50	.....
Petroleum, bbl., Kansas crude..	.70	.70	.70	.70	.70	.70	.....
Petroleum, bbl., Pa., crude....	1.60	1.60	1.60	1.60	1.60	1.60	.....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	.....
Rubber, Fine, Up-river Para.	1.07	1.07	1.08	1.08	1.09	1.09	+.02
Silk, raw Ital....	....	4.15	....	....	4.15	....	.....
Silk, raw Japan..	....	4.10	....	....	4.10	....	.....
Sulphuric Acid, 60 Beaumé....	.99	.99	.99	.99	.99	.99	.....
Tin, 100 lbs	5.00	5.00	....	4.93	4.90	4.90	—.10
Tire scrap.....	.09⅛	.09⅛	....	.09⅛	.09⅛	.09⅛	.....

Lyons Buys Atlas Plant

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New Concern Incorporated as Lyons-Atlas Company Will Continue to Make Knight Engines for Trade

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Wells Fargo Places Order for Thirty-Five Trucks—Kelly Expands—Shanks Sales Manager

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INDIANAPOLIS, IND., Oct. 15—With the approval of Judge Weir, of the Superior Court, Fred. C. Gardner, receiver for the Atlas Engine Works, this afternoon sold the property of the company to the Lyons-Atlas Company, organized and incorporated here today, with authorized capitalization of $500,000. The new company will continue the manufacture of Silent-Knight motors for the trade and also of the Diesel oil engines.

The property was bought subject to a mortgage deed of trust given by the Atlas company to the Indiana Trust Company as trustees. The new owner is to pay $46,100 interest on $1,050,000 in bonds secured by the mortgage deed of trust and also $105,000 incurred by the $1,500,000 bond issue as well as $48,187.04 secured by $63,000 worth of accounts and bills receivable. Also $80,000 cash to pay receivership expenses and debts incurred during receivership, together with $6,700 in judgments against Atlas personal property, merchandise, materials, patent rights, trademarks, account bills receivable, conveyed outright free of liens. The holders of common stock will receive nothing.

The stockholders in the new company have been in the manufacturing business in Chicago. The officers are as follows: James W. Lyons, president; William P. Lyons, vice-president; George W. Lyons, secretary-treasurer. The company will employ more than 2,000 men.

INDIANAPOLIS, IND., Oct. 16—*Special Telegram*—The company has parts on hand for the two models which the old Atlas company brought out, the four and the six-cylinder motors, each 4 1-2 by 5 1-2-inch, bore and stroke, but in the immediate future it is planned to turn out other models, plans for which are now going through.

J. W. Lyon, the president of the new concern, will be the active head of the company and will move to Indianapolis. As to the other officials nothing has been definitely settled outside of the decision to retain F. H. Baker as general superintendent. Mr. Lyon is a gas engineer expert and at one time was connected with Allis-Chalmers.

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Wells Fargo Buys Thirty-Five Trucks

About one-third of the reported order for 100 automobile trucks for the Wells Fargo Express Company has been placed according to statements current in the industry. The present order numbers thirty-five and is divided among seven companies as follows: General Vehicle, nine electrics; American Locomotive Company, six gasoline trucks; Packard, six; Peerless, six; Mack, four; General Motors, four, and Lansing, one.

The cars will be distributed among the New York, Chicago, St. Louis and San Francisco establishments of the company. The trucks ordered are mostly of the 2-ton and 3-ton sizes.

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Kelly Expands; Shanks Manager

SAN FRANCISCO, Oct. 10—Charles B. Shanks, who has been appointed general sales manager of the reorganized and enlarged Kelly Motor Truck Company, of Springfield, O., will assume active charge of that department within a short time. The company had just increased its capitalization from $500,000 to $4,000,000 and contemplates a big increase in manufacturing.

Appeal Patent Tread Suit

Validity of the Adams Midgely Tread Claims Depends upon Interpretation of the Term Interwoven

APPEALING from the decision of United States Circuit Judge Platt, against the patent of Calvin T. Adams covering a certain kind of automobile tire tread in which wire was interwoven to give greater life and non-skidding properties, the Metallic Rubber Tire Company and the Hartford Rubber Works Company appeared before the United States Circuit Court of Appeals last week.

The appellant is the assignee of Adams as to the patent in suit, which is numbered 609,320 and granted August 16, 1898.

The only claim contained in the application is as follows: "The combination with a cushioned vehicle tire, of a tread applied to the entire periphery of a tire, and having metallic wire interwoven with itself, parts of said interwoven wire lying substantially flush with the outer surface of the tread and forming cushioned anti-slip bearings covering the sides and bottom of the tread."

The defendant company manufactures a tire known to the trade as the Midgely tread which consists of embedding a series of wire coils in the rubber before vulcanization.

It was claimed that the Midgely tread infringed the Adams patent.

Judge Platt in the lower court decided that the defendant did not infringe and the case went up in due order.

In the present hearing the complainant's attorneys, Alfred Wilkinson and J. H. Roney, contend that the opinion of the court below was based only upon an erroneous view of the prior art, particularly outlining the alleged worthlessness of several old British patents and holding that the terms of the patent were sufficiently broad to cover the Midgely construction.

The defendant's attorneys, E. W. Vaill and Livingston Gifford, argue for an affirmation of Judge Platt on the grounds that there has been no infringement because the wire is embedded in the Midgely tire and the Adams patent applies only to interwoven wire.

As additional defenses it is alleged that the Adams patent is completely anticipated by the Phillips British patent of 1893; that in view of the prior art there is no invention; that the Adams patent has been abandoned within the purview of the statute and that the claim is inequitable.

The case apparently turns on the interpretation of the term interwoven, as contained in the claim in suit.

Offers Made for Newark Factory

NEWARK, N. J., Oct. 14—The trustee acting in the matter of the bankruptcy of the Newark Automobile Manufacturing Company has reported to the United States District Court that he has received an offer to purchase the factory building and real estate of the embarrassed company and also an offer to rent the same until December 1, 1913. A meeting of the creditors will be held October 21 to consider the offers.

Forestalling Another Car Famine

INDIANAPOLIS, IND., Oct. 14—The car shortage situation has become somewhat acute and there is the greatest difficulty in getting sufficient freight cars to move motor car shipments promptly. It is thought by some that the present situation is only a forerunnner of what is to come and that before many weeks there will be an alarming car famine.

Desiring to avoid a genuine car famine, local motor car manufacturers have already taken up with the railroad companies the matter of getting the greatest possible efficiency out of freight cars and moving all freight traffic promptly.

One day last week a conference between motor car traffic managers of the city and traffic officers of the New York Central Lines was held in the Board of Trade Building in this city. A rather thorough understanding was reached with the railroad men and it is believed beneficial results will obtain.

Motor car concerns represented at the conference were the Nordyke & Marmon Company, Cole Motor Car Company, National Motor Vehicle Company, Marion Motor Car Company, Ideal Motor Car Company, American Motors Company and the Mais Motor Truck Company.

Marks Patent in Court Test

BUFFALO, N. Y., Oct. 14—The Philadelphia Rubber Works Company, of Philadelphia, brought action last week in Federal Court to restrain the United States Rubber Reclaiming Works from infringing on a patent held by the former concern. J. Kearsley Mitchell, president of the Philadelphia Rubber Works Company, asserted that letters of patent on October 17, 1899, were granted to Arthur M. Marks for certain new improvements in the process of reclaiming rubber from vulcanized rubber waste.

These letters of patent, according to the complaint, were assigned to the Diamond Rubber Company, the Alkali Rubber Company, and to the Philadelphia Rubber Works Company, which is bringing the suit. The complainant requests that the Buffalo concern pay the rubber firm in Philadelphia the profits and income alleged to have been unlawfully derived in violation of the complainants' rights. The complainant asks also that its company be paid damages to the extent of three times the loss suffered by the Philadelphia concern. Decision was reserved.

Hartford-Connecticut Case Argued

Motion for a preliminary injunction against Walter H. Ellis, doing business as the Ellis Motor Car Company, of Newark, N. J., was argued on behalf of the Hartford Suspension Company before the United States District Court, of New Jersey, at Trenton on Monday. Decision was reserved.

The suit is one of several now pending, that have been started by the Hartford Suspension Company to protect its rights under the Truffault patents covering the principles embodied in the Truffault Hartford shock-absorber. The alleged infringement, as outlined in the complaint, consisted in the selling by the Ellis company of shock-absorbers made by the Connecticut Shock Absorber Company, which are alleged to contravene the rights of the complainant.

The case will probably be brought to issue before the end of the year and may be heard before spring.

In the argument Monday the complainant suggested that a bond of $20,000 would be acceptable as a release from the operation of a preliminary injunction pending the hearing of the case.

Clifford E. Dunn represents the Hartford company and Bartlett, Brownell & Mitchell act for the defense.

Court to Test De Tamble Bonds

ANDERSON, IND., Oct. 14.—A meeting of the creditors of the De Tamble Motor Company was held October 9. John C. Teegarden, temporary receiver of the concern, was appointed trustee for the $75,000 of unsecured claims. There is in addition to the unsecured claims a mortgage bond indebtedness amounting to $133,000. It was reported at the creditors' meeting that some of the bonds have been purchased at 10 cents on the dollar and an effort will be made to have the court consider the bonds at the price at which they were sold, instead of at par value.

Big Bay State Registration

In Past 9 Months 47,431 Cars Took Out Licenses, as Compared with 36,796 for 1911

BOSTON, MASS., Oct. 12—Massachusetts, which has had more cars registered each year than the other New England states combined, bids fair to continue its record when 1912 ends, for already there is every indication that the figures will show close to 50,000 cars on the list this year. With 9 months passed and 3 more to go there have been registered by the Highway Commission 47,431 cars while the full year of 1911 had 36,796 cars registered so that the increase to date over last year is about 33 per cent.

In the amount of revenue from the motor industry the Bay State is reaping a harvest again this year. The state has received $583,359 so far this year while the total for 1911 was $466,199, or $177,160 more than all of last year. That the figures will go above $600,000 seems certain. This is a remarkable growth in a decade, for 10 years ago the state received from motorists but $17,684. Here are the figures showing the amount of money received annually during these years:

1903	$17,684.00
1904	19,162.00
1905	24,490.50
1906	33,085.50
1907	92,096.50
1908	121,488.50
1909	169,973.54
1910	374,038.25
1911	466,199.75
*1912	583,359.00

*To Oct. 1.

The figures for registrations, operators, dealers, etc., show an increase all along the line, and this is particularly true of the motorists who register in the state for a couple of months, there being more than 100 of them this year. The following figures give the entire year of 1911 and up to October 1, of 1912.

	1911, entire year.	1912 to Oct. 1
Automobiles	36,796	47,431
Motor cycles	3,712	4,720
Manufacturers or dealers	829	1,064
Manufacturers or dealers (motor cycles)	13	22
Operators	10,232	12,988
Operator renewals	24,842	30,495
Chauffeurs	3,695	5,348
Chauffeur renewals	9,449	11,625
Examinations	5,386	5,512
Total fees	$466,199	$583,359

COLUMBUS, O.—At the close of business September 30, 1912, the Ohio State Automobile Department had issued 61,500 license tags since January 1 of this year. On September 30, 1911, the number issued was 44,800 and the total for the year 1911 was 45,788.

INDIANAPOLIS, IND.—During the three months ending September 30 the number of motor registrations in Indiana was 5,222, according to a report made by Lew W. Ellingham, secretary of state. During the same period of 1911 the number of registrations was 3,467, showing a gain of 1,755.

MADISON, WIS.—For the fiscal year ending July 31 the secretary of state of Minnesota reports receipts of $60,168 from license fees for automobiles and from chauffeurs. The previous year the total was $30,385.

Milwaukee Motor's Working Plans

MILWAUKEE, WIS., Oct. 14—The Milwaukee Motor Company, of Milwaukee, Wis., has been reorganized following the sale of the controlling interest by E. E. Warner and C. F. Kaiser, founders of the big works, to other interests. The new official personnel consists of the following: President, J. C. Coerper; vice-president, August John; secretary and treasurer, Henry John. August John will be general manager. J. D. Bowes, former vice-president, remains as a director of the corporation and will act in a managerial capacity. James Church, formerly of the Davis Gas Engine Company, has become associated with the reorganized motor company in a prominent mechanical capacity.

The Milwaukee Motor Company was organized in 1903 with a capital of $10,000 and today owns and operates a large factory, producing several thousand motors for pleasure cars and trucks annually. Additions to the works and improvements, including equipment, now being completed, aggregate in value $80,000 and will require a working force of more than 600 skilled laborers. The contracts now on the books amount to $1,000,000. The retiring president, E. E. Warner, will continue in an advisory capacity for a short time. He will then take a vacation, his first in 9 years, and re-enter business, the nature of which he is not willing to announce at this time.

Marmon Nominated as S. A. E. President

The following nominations have been made for the various offices in the Society of Automobile Engineers:

For president, Howard Marmon.

Vice-presidents, Russell Huff and John G. Perrin.

Treasurer, Herman F. Cuntz.

Members of Council, Joseph A. Anglada, Eugene F. Russell and Harold L. Pope.

The nominations were made by the regularly appointed committee on nominations and the election will be by mail vote in which all persons of either of the member grades may participate. The vote will not be announced until just prior to the annual meeting of the society during the second week of the New York automobile show about the middle of January.

Grabowsky May Continue Work

DETROIT, MICH., Oct. 16—An order modifying the injunction filed by John C. Kimble September 17 against the Grabowsky Power Wagon Company, of this city, was signed and filed in the Wayne County Chancery Court, October 14. The original injunction as filed by Kimble restrained the Grabowsky concern from carrying on business as well as preventing its sale. The intention of Kimble was merely to restrain the sale and the original order has been modified to this effect.

Canada's Industry Increases

MONTREAL, Oct. 11—The census reports of manufactures taken in 1911 for the calendar year 1910 are now compiled. Compared with the census of 1901 for the year 1900, they show an increase in the 10 years of 4,559 in the number of working establishments; of $798,829,009 in the value of capital; of 175,108 in the number of persons employed; of $127,274,301 in the earnings of salaries and wages and of $683,722,157 in the value of products.

The statistics of establishments for 1910 are given in the following table. The number of industries is 300 as compared with 274 in 1905 and 264 in 1900.

Establishments	Capital Employed	Employees	Salaries	Value of Products
19,209	$1,245,745,496	514,281	$240,523,651	$1,164,775,532
	AUTOMOBILES.			
8	4,699,256	2,438	903,394	6,251,885
	AUTOMOBILE ACCESSORIES.			
11	361,272	132	76,060	170,930

McGraw Company Cuts a Melon

EAST PALESTINE, O., Oct. 14—At the regular monthly meeting of the McGraw Tire & Rubber Company October 9 it was unanimously voted to increase the capital stock from $100,000 to $250,000. Acting upon the favorable report of the year's business made by President E. C. McGraw, the directors voted a stock dividend of 50 per cent. plus a cash dividend of 10 per cent.

The McGraw Tire & Rubber Company has made several important additions to the plant this year, including a laboratory.

Evolution of Fire-Engine

Progress Made in Past 76 Years Shown by Photographs Depicting Ancient and Modern Types

From Old Hand Pump to Advanced Model of Steam-Electric Automobile Apparatus Is Far Cry

JUST how much progress has been made in the past 60 years in building fire-fighting apparatus is vividly pictured in the accompanying photographs showing the fire-engine of 60 years ago and the highest type of automobile fire-engine of the present day.

The first photograph shows one of the first fire-engines ever built. It was used in Cincinnati in 1836 to 1853. Eight volunteer firemen pulled it to the scene of action. These same firemen operated the big hand pump, which threw a stream from a 2-inch nozzle a distance of 50 feet. The apparatus was considered a wonder in those early days of fire fighting.

After this early type of fire-engine, came the one drawn by horses, one which is still used but rapidly being replaced in this age of automobiles by the motor-driven fire-engine of the present day with a speed of 50 miles per hour and as far superior to the horse-drawn apparatus as that one is over the old hand pump engine.

The ultra-modern automobile fire-engine of the near future is shown in the last photograph. This is a steam-electric automobile apparatus that travels with the speed of the wind. A rate of 75 miles per hour can easily be attained by this automobile machine. It has lost all resemblance to its former brothers and sisters and is built on an entirely new principle with electrically-operated pumps. A single stream from a 3-inch nozzle can be thrown a distance of a city block or 200 feet up the side of a skyscraper. Two streams go just half as far but the volume of water is so great that it resembles a good size rainstorm that can flood any building in five minutes. The pumps operate silently. There is no smoke, no cinders or ashes to litter up the street where it operates. It is considered the last word in automobile fire-engine construction and is said to be the coming universally used automobile fire-engine.

Small Crowd at Springfield, Mass., Races

SPRINGFIELD, MASS., Oct. 12—Before a crowd numbering 3,600, a program of automobile races was given at the Imperial Park half-mile track this afternoon. The track was slow and the fields small. T. B. Shoemaker, of New York, acted as referee and representative of the American Automobile Association. There were no accidents and no protests were filed by the contestants.

The events comprised a 3 and a 5-mile free-for-all, won by Mercedes (Hickman) and Mercer (Grennon), respectively; 3 and 5-mile races for cars having less than 601 inches piston displacement, taken by Pope-Hartford (Kyle) and Mercer (Grennon); a 10-mile match race between Pope-Hartford, Mercedes and Zust, won by the first, driven by Kyle, in 15:06, and a 5-mile handicap taken by Grennon's Mercer.

Hoosiers Plan Run to the Pacific

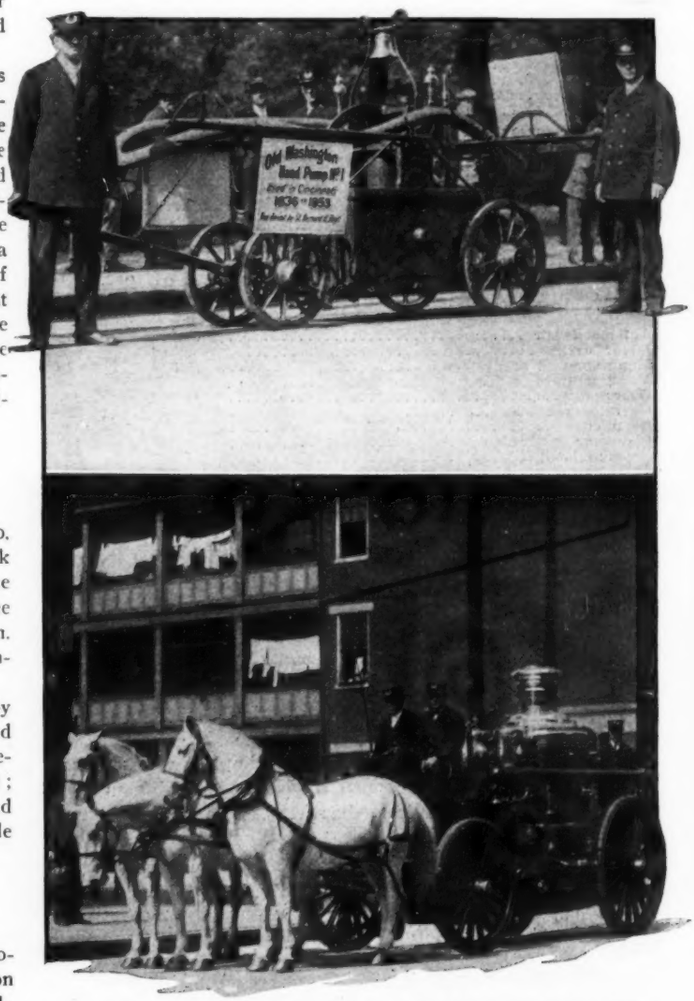
INDIANAPOLIS, IND., Oct. 14—At a meeting of the Indiana Automobile Manufacturers' Association here recently, a proposition to conduct the 1913 run to San Francisco was taken under advisement. It was proposed to follow one of the routes proposed for the rock highway projected by Messrs. Fisher and Allison, this taking the place of the Four-State Tour. The route proposed is through St. Louis, Kansas City, Omaha, Denver, Salt Lake City, Ogden, Sacramento and San Francisco, taking about 40 days for the round trip.

A plan also was proposed to run a special train for Indiana exhibits to the New York show in January, making stops en route at Philadelphia and Pittsburgh. The by-laws were amended to provide for the annual meeting in September and nine directors were elected.

May Open Yosemite to Automobiles

SAN FRANCISCO, CAL., October 12—Secretary of the Interior, Fisher will hold a conference in the Yosemite Valley, on October 14 for the purpose of deciding whether or not motor cars shall be admitted within the valley, which for several years past has been under Federal control and in charge of United States troops. A concerted effort is being made by the automobile men of California to secure the opening of the valley to the automobile, and it is confidently expected that Secretary Fisher will accede to the request.

It is recognized that the steep roads and narrow grades of the valley make precautions necessary, and it is probable, therefore, that the motor cars will be restricted to the use of one of the three roads entering the valley. Otherwise they will be permitted to use any of the three roads, but only during certain hours of the day assigned to them. The latter plan is the most generally favored by dealers and owners.



Upper picture shows most efficient fire-fighter in use back in 1836—It was a man-drawn, hand-pumping device—The lower cut shows the efficient type of horse-drawn engine, the best 20 years ago

Oil Man Talks Gasoline

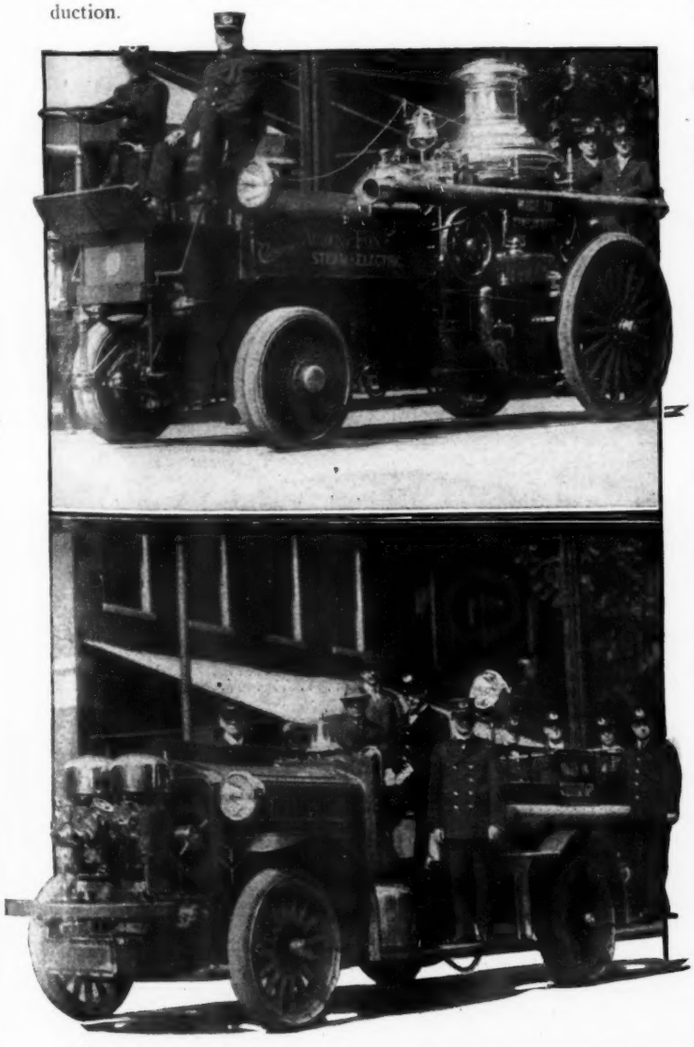
Sees Only Working of Supply and Demand Law in the Recent Series of Price Bulges and Jumps

Shows That Recently Discovered Oil Wells Produce Small Proportion of Potential Gasoline

FROM the viewpoint of the oil man, the extraordinary bulges that have marked the course of the gasoline market during the past year are simply evidences of the working of the law of supply and demand. The following article prepared by a prominent oil man outlines the situation as he sees it:

"In order to understand fully the situation in regard to supply of gasoline it should be understood that a considerable proportion of the oil produced is not suitable for the manufacture of gasoline.

"The state which produces the largest number of barrels (California) with a total of 81,134,391 barrels, produces only a comparatively small amount of oil suitable for gasoline manufacture, the bulk of this oil being only for fuel, road oil and asphalt production.



Two types of ultra-modern fire apparatus. The upper photograph shows a motor-driven fire engine which has a speed of 75 miles an hour and which uses electrically-operated pumps

"Dr. David T. Day, of the U. S. Geological Survey, in his report on the production of petroleum for 1911, states that while fuel oils increased, refinery oils declined. It is from the refinery oils that the gasoline production is secured.

"It should also be noted that gasoline can only be secured to the extent of the small percentage which is found in the oils, and where gasoline is not found in such percentage to pay for refining, the oil cannot be used for this purpose.

"The figures given below show that while the general production of oil for 1911 increased over 1910, there is no increase perceptible in 1912 over 1911, and in all cases where increase has occurred, the oil has been of such a character as to yield practically no gasoline.

"In the meantime the consumption of gasoline has increased yearly between 65 to 100 per cent. In other words, the oils from which gasoline can be drawn have not increased in quantity and it has been necessary to draw largely upon the accumulated stocks for the supply of gasoline.

"On account of the increased requirements for refinery oil, the price of crude oil suitable for refining purposes has risen approximately 33 1-3 per cent. during the last year.

"Not more than 6 months' supply of oil is in stock even in California where much of the oil is not suitable for gasoline manufacture, and in many cases, the supply on hand is much less.

"The total production of oil for 1911 (from the report of Dr. Day) 220,449,391 barrels.

"Delivered for all purposes during 1911, 229,567,581 barrels.

"While the reports for 1912 are not yet available, the records so far given show practically no increase over 1911.

"Stocks of refining oils:

December, 1910	93,038,828	bbls.
December, 1911	81,791,433	"
June 30, 1911	76,421,058	"

"The production from the fields which supply most of the refining oil stands as follows:

1910	126,255,667	bbls.
1911	127,215,812	"
(6 mo.) 1912	62,900,069	"

"In the meantime, some figures on the automobile business give the following number of cars in service:

	Pleasure Cars	Commercial Vehicles
December, 1910	350,000	No Record
December, 1911	550,000	No Record
June, 1912	859,000	32,000

"With an estimated production of the automobile factories for 1912 of 300,000 cars.

"To this must be added the number of stationary engines, gasoline traction engines, motor boats and yachts, the production of which has increased several hundred per cent. in the last 3 or 4 years.

"In other words, while the supply of oil has increased slightly, the supply of gasoline is not increased, but demand is going up by leaps and bounds, and as a consequence, the material is increasing in value."

Glidden at Hoosier Capital

INDIANAPOLIS, IND., Oct. 15—Charles J. Glidden, who is touring over the route selected for the A. A. A. national reliability tour from Detroit to New Orleans, reached this city today. He was escorted from Detroit by a number of cars and was received by the Hoosier Motor Club. Tomorrow's run is to Louisville. Mr. Glidden is using a Maxwell car.

Iowa Tour Finally Starts

DES MOINES, IA., Oct. 16—After three postponements the third annual Little Glidden tour of the Iowa Automobile Association left Des Moines early Tuesday morning for an 830-mile trip over Iowa. Five days will be consumed on the run and a complete circuit of the state will be made.

Harvest Proves a Bumper

Final Report of Government Shows 20 Per Cent. Increase Over Average of Last Year Throughout Land

Industrial Council Formed to Work for Safety of Employees—Automobile Trade Interested

WASHINGTON, D. C., Oct. 14—Crop reports as of October 1, just issued by the Department of Agriculture, are unusually favorable. This date is recognized by the Department as harvest time, and computations are made with reference to it. The composite condition of all crops on October 1 was about 20 per cent. better than last year, and 10 per cent. better than in an average season. The composite condition of all crops in each state on October 1, or at time of harvest compared with the same time last year and the averages of recent years is given in the table at the bottom of the page.

Industrial Safety Council Organized

MILWAUKEE, WIS.—The safety congress held at Milwaukee from September 30 to October 4 under the auspices of the Association of Iron and Steel Electrical Engineers has resulted in the organization of the National Council for Industrial Safety, which will conduct an American Safety Congress in 1913 at New York, and an international congress at San Francisco in 1915, in conjuction with the Panama-Pacific exposition. All of the big automobile manufacturers of America will be invited to join the National Council, the importance and magnitude of this and allied industries having received instant recognition.

Court Decides Against Insurance Company

The literature of automobile insurance litigation was enriched this week by the trial of the suit of William P. Hardenburgh, former vice-president of the New Jersey Zinc Works against the Employers' Liability Assurance Company, of London. Mr. Hardenburgh owned a car and, like a prudent man, insured it against road accidents. The policy of insurance was written by the defendant company. If there never had been any accident or claim made under the policy, Mr. Hardenburgh never would have known whether he was protected or not. As it turned out, he found that he was protected, but he had to take the matter to court to develop that fact.

The circumstances of the case, as they were brought out at the hearing on Monday before Justice Green in the City Court showed that while Mr. Hardenburgh was driving near Far Hills one evening about a year ago, he ran off the road and wrecked his car in the ditch.

To the average person the mishap was a road accident, but the Employers' Liability Assurance Company, of London, did not so construe it and through its representatives informed Mr. Hardenburgh that the accident occurred in the ditch and not on the road. But in addition the defense was put in that the road in question was not a real road, improved and protected by the authorities. In fact, it was only such a road as was under the jurisdiction of the Highway Commission. For that reason the company asked the court to dismiss the case.

The reasoning of the defendant did not appeal to Mr. Justice Green who instructed the jury to find a verdict of $635 in favor of Mr. Hardenburgh.

How to Avoid Freight Car Famine

Anticipating prospective shortage of automobile freight cars, when the shipping season opens in full blast, the National Association of Automobile Manufacturers, through James S. Marvin, assistant general manager, has issued a circular to the members of the organization warning them to be prompt in loading and unloading freight cars and cautions to members to load the cars to their full capacity if possible.

The circular recommends that shipments of supplies should be ordered in units of as much size as possible and to specify automobile cars so that the factories can reload such cars with their finished product.

Last winter and spring there was some complaint on the part of the railroads that automobile cars were tied up at various points of consignment because dealers failed to take prompt delivery.

TABLE OF CROP REPORTS TO OCTOBER 1

State	1912 Compared With		State	1912 Compared With	
	1911 Per Cent.	Average P. C.		1911 Per Cent.	Average P. C.
Maine	103	104	Missouri	124	103
New Hampshire	122	114	North Dakota	148	124
Vermont	115	113	South Dakota	213	108
Massachusetts	119	103	Nebraska	140	98
Rhode Island	111	100	Kansas	160	114
Connecticut	110	99	Kentucky	112	104
New York	117	101	Tennessee	99	98
New Jersey	115	103	Alabama	94	100
Pennsylvania	120	105	Mississippi	100	96
Delaware	113	106	Louisiana	101	100
Maryland	118	105	Texas	128	115
Virginia	110	93	Oklahoma	165	102
West Virginia	158	115	Arkansas	100	98
North Carolina	97	95	Montana	101	106
South Carolina	96	94	Wyoming	104	96
Georgia	87	92	Colorado	129	101
Florida	99	98	New Mexico	96	100
Ohio	105	99	Arizona	91	108
Indiana	107	96	Utah	112	100
Illinois	113	99	Nevada	100	128
Michigan	99	97	Idaho	97	105
Wisconsin	114	104	Washington	100	105
Minnesota	138	110	Oregon	113	113
Iowa	140	112	California	95	97

In the statement above the September 1 condition figures are used for oats, spring wheat and barley; the yields per acre, as reported on October 1 have overrun somewhat the yields indicated by the condition figures, which would tend to increase the above figures for some of the important oats, barley and spring wheat states, as Illinois, Minnesota, Iowa, North and South Dakota and Nebraska.

(Continued from page 763)

the market always responds with more or less accuracy to fluctuations in that grade, the curves are not concentric:

Year	Price		
1894	$0.64½	to	$0.73
1895	.70	to	.81½
1896	.71	to	.85
1897	.79½	to	.89
1898	.82	to	1.06
1899	.91	to	1.10
1900	.83	to	1.11½
1901	.76	to	.95
1902	.66	to	.92
1903	.78	to	1.13
1904	.89	to	1.32
1905	1.13	to	1.35
1906	1.16	to	1.28
1907	.69	to	1.24
1908	.65	to	1.30
1909	1.13	to	2.15
1910	1.16	to	2.90
1911	.90	to	1.67

It will be noted from the foregoing that between 1894 and 1904 the average price ran around 90 cents and that from 1904, when the automobile began to exert some influence, the price rose to an average of $1.05 a pound during the next 5 years. In 1909 it bulged up to $1.64 on an average, and in the following year reached a general average of $2.02. The maximum price quoted is set at $2.90 because the real top of the market, 20 cents higher, was for only a certain grade of up-river and only held for a short time. The sharp decline since 1910 is the result of response to economic influences embodied in the universal law of supply and demand.

Improving Body Finish

Mechanical Improvements on the Modern Car Demand a Correspondingly Artistic Appearance—Use of the Dark Room

French Attain Best Results by Getting Preliminary Coats Worked Down Close and Hard

EARLIER issues of THE AUTOMOBILE have told the conspicuous part which good painting and finishing has played and is playing in making the automobile a beautiful example of craftsmanship.

The motto of the painter spells Improvement, which means that there is no going backward nor no standing still. The car is being improved mechanically and it must continue to be improved artistically.

One improvement connected with the varnishing of the modern motor car is the dark room. This department, adjoining the varnish room, is equipped with shutters and dark curtains. With the vacuum cleaner it can in a short time be made clean. The heating capacity is equal to anywhere from 70 to 100 degrees. It is provided with a system of ventilation through the ceiling which furnishes pure fresh air in a quantity sufficient to assist the drying of the varnish.

It is a room in which the freshly varnished surface set for anywhere from 24 to 48 hours at a temperature of not less than 70 degrees takes on a high, sharp brilliancy quite unattainable in a room flooded with light.

After this deep, high lustre is assured the work is removed to the light room, i. e., a room in which plenty of bright light prevails. Here, too, the varnish, cured and set to a degree of striking lustre, is further dried and its brilliancy given an increased permanence by the light shed upon it.

The basis for the installation of the dark room is founded upon the fact that in the light room there is always a movement of dust atoms. This movement can best be ascertained by looking into a shaft of sunlight penetrating the room. Through this shaft the particles of matter will be found floating in myriads. In the absolutely dark room this dust movement is eliminated, or at any rate more completely eliminated than in the room containing some measure of light. **So far as possible this room during construction should be made dustproof.** Through the use of it clean surfaces and brilliant finish are produced.

Many years ago French chemists established the fact that after a varnish sets up free from dust during the process of which the dark room is the preferred storage quarters, plenty of light, barring direct sunlight, not only increases the brilliancy of the high lustre established in the dark room, but serves to give the varnish a firmness of film and a capacity to respond to all the varied exactions of service which could be obtained under no other circumstances.

This consignment of work to the dark room immediately following the application of the varnish is called in New York, Chicago and other large cities the beauty treatment. It is not precisely a new method of developing varnish lustre, but rather the resurrection of an old-time carriage finishing room practice.

Another practice which the car owner in making a demand for an improved quality of painting and finishing is forcing upon the painter is this, namely, more thorough rough coat surfacing. By this we mean that the priming or first coat and the coats closely following this and including the foundation of roughstuff are to be worked up with greater care and accuracy than has heretofore been the case. This applies to both old and new work. An American paintshop expert lately returned from abroad declares that the painting and finishing of French cars excels not so much by reason of superior color treatment or varnishing, but rather through the painstaking attention given the foundation or surfacing coats of material —the finesse, in fact, lavished upon the many little and at first glance insignificant details of surface building.

Even the first coats are given the greatest possible attention. So carefully is the paint prepared and seasoned and made fine and smooth of consistency that where it is applied and brushed out it has a smoothness and an appearance of good workmanship that it is a pleasure to see. Over this coat a like excellent second coat is put on, brushed out clean and velvety, and when dry the surface is gone over with great care and all defects, etc., puttied.

Above this coat anywhere from five to six coats of roughstuff are put on in as many days. This body of coarse pigment is allowed from 3 to 6 days to cure out and harden, whereupon it is rubbed down to a smooth and level surface with artificial pumicestone, using with the stone a generous supply of water to keep the stone working free and prevent gumming up. This is the practice in vogue in this country, **except that no great attention is paid to getting these coats under the last coat of the roughstuff worked down as close and hard as the French method calls for.**

A vacuum cleaner working by suction forms an ideal cleaner for use in removing dust and dirt from surfaces that have been sandpapered. Practically every atom of dust is licked up with the cleaner. In this way the rubbing of the roughstuff is made much easier and the surface is kept free from things which serve only to give the painter trouble.

Two and three coats of color are now being used in order to establish a density of color over which, in due season, are applied three coats of varnish color, each containing a gradually diminishing quantity of color.

Above these pure and simple varnish color coats two and three coats of so-called clear rubbing varnish is used. **Into this varnish is put a few drops of the body color in order to preserve the integrity of the field color.** These coats are further rubbed with pumicestone flour and water to give the foundation body and stability.

Then, last of all, the surface is carefully washed, cleaned up, touched up if necessary, and flowed with a coat of some elastic finishing varnish.

The drying room or baking oven is another device which promises to materially assist in getting cars through the paintshop quickly and with plenty to admire. In many parts of the country these drying rooms are used in connection with the application of all the varnish coats. **By a little forcing of these plants two and even three coats of varnish may be applied per day. For first class work, however, this practice is not to be commended.**

In subjecting a finishing varnish for several hours to a temperature of say 140 degrees you of course get a very fine and well dried finish, but it is an open question if such a finish will stand up and hold its elegant looks to the same extent that a varnish seasoned under the natural conditions of ordinary varnish room practice will. Nevertheless it is more than likely—indeed it is certain—that **within the next few years the drying room or baking oven will find widespread use.**

In making plans to maintain the car in first class condition it is well at all times to bear in mind the hard service to which the chassis or running parts are exposed. Mud, dust, oil and grease saturate these parts. **To remove these substances requires a cleaning practice which in the very nature of the case must be more or less destructive.** For such parts, then, a varnish is needed and should be used which dries quickly and hard, after the manner of a baked finish, at the same time retaining elasticity sufficient to insure its durable wearing properties. Hoods and fenders should invariably be varnished with an elastic finishing varnish capable of withstanding the constant vibration and the expansion and contraction.

Digest of the Leading Foreign Journals

Argument for Correct Mounting of Shackle Springs Suggests a Convenient Graphic Method for Laying Out Spring Suspensions in General—New Planetary Gear from Germany—Safe Children's Cars—Seeing Sparks by X-Rays

FUNCTION of Auxiliary Springs—A study of spring and shock absorber action is presented by N. Duaner in *Le Génie Civil* having for its object to show how shackle springs should be used. The properties of an ordinary spring suspension are formulated mathematically and it is shown that the formulas confirm the established theories to the effect that (1) with a given flexibility of the leaf spring or helical spring the oscillations are more rapid the lighter the load and therefore more disagreeable and injurious, (2) that the load and the flexibility should vary inversely, and (3) that an increase in the frictions of a spring suspension always has the effect of reducing the amplitude and duration of oscillation. It is further shown that the dangers of unrestricted oscillation—in the way of breaking springs and catapulting passengers—should be counteracted and that the problem involved in doing so is intricate; so much so that in the artillery, for example, all spring suspension is dispensed with although a mitigation of shocks would be desirable. Shock absorbers under various names are with these facts in view devised for the especial purpose of reducing the amplitude of oscillations while avoiding the effect of increasing their velocity or, in other words, to effect a suspension whose movements are timed as those of a flexible spring and spaced as those of a stiff spring insofar as this may be done. In practice the requirements of these devices are (1) that they shall have no effect on small oscillations, (2) that their action shall be progressive, restraining a large deflection more energetically than a smaller one and (3) that their action shall be of short duration, so as to place the vehicle spring in its position of equilibrium with the static load as quickly as possible, ready to receive a new shock if one should arise.

[Compare herewith the theory that it is the function of auxiliary devices to leave every departure of the vehicle spring from its normal position perfectly free and unrestricted while braking the return of the spring to this normal position so effectually that if possible no oscillation to the other side of the position of equilibrium takes place. The Derihon device, designed on this principle, was described in THE AUTOMOBILE of June 13; another hydraulic device in the issue of June 20.—ED.]

If it is now assumed to be the main function of auxiliary devices to establish a decreasing flexibility in the spring suspension of a vehicle according to the severity of the shock received it becomes interesting to examine the conditions under which they correspond to this requirement. With ordinary springs, whether leaf or coil springs, it cannot be met, since their flexibility is approximately constant, but arrangements may be made for having several sets of ordinary springs enter successively into action as is done in practice by means of overload springs or buffers. Many of the shock absorbers, while unsuitable for sustaining a static load, are perfectly well adapted for establishing a decreasing flexibility and at the same time reducing the duration of oscillations, but in practice they are adjusted to only one load. Neither with a minimum load or with an overload do they leave the small oscillations free. The most interesting devices, because the simplest and most generally used, are the auxiliary springs which are applied as elastic shackles and which may be used with or without shock absorbers and with or without supplementary overload springs. By means of shackle springs it is possible to realize to a certain degree a suspension with variable flexibility, but as they are usually applied this advantage is not obtained. If they may be used to give additional flexibility in all cases when the maximum load is not carried to a suspension which has been designed for the maximum load their utility may be conceded.

[The author here shows by means of two separate diagrams that spring shackles mounted without initial tension are faulty and that those with unlimited action (being a range of flexion equal to that of the leaf spring) cannot serve any other purpose than at best that of correcting the action of a spring which is too stiff for its maximum load, but it would seem to be evident without special argument that an auxiliary spring should fill its framing when supporting its minimum working-load or, in other words, should be under the tension of that load, and also that, if its range is unlimited it must not only be long and cumbersome, but will continue to add its flexibility to that of the leaf spring throughout the range of action of the latter and thus fail to bring about the desired decrease of flexibility for the more severe shocks. However, in the remodeling of a vehicle or in transforming a heavy limousine or a vehicle of other heavy type into an open and lighter car it may be convenient, as noted by the author, to remodel the spring suspension by means of auxiliary springs with a long range of action and with an initial tension corresponding to the reduced weight of the new vehicle body. The smooth, restful spring action which is obtained from a leaf spring of suitable flexibility, because the friction between its leaves tends to moderate its oscillations, can scarcely be obtained by this means, however.—ED.]

A diagram of the spring action is useful to show how the auxiliary springs should be applied. In Fig. 1 the axis Ox represents the varying loads in kilograms, while the deflections of

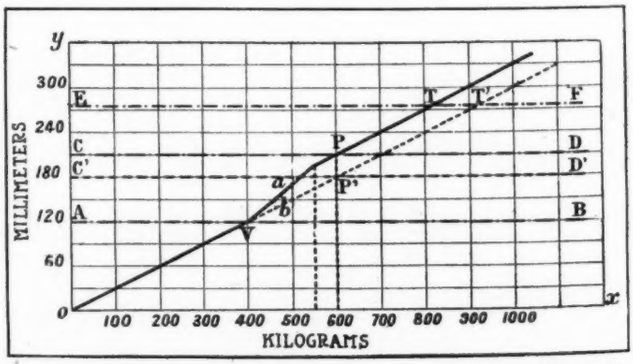


Fig. 1—Diagram of combined leaf-spring and shackle-spring action for minimum load of 400 kg. and maximum static load of 600 kg.

the spring equipment are counted in millimeters on the axis Oy. Assuming a flexibility for the leaf spring of 30 per cent. [which by the convenient French method of notation means that the spring gives a lineal deflection of 30 millimeters for each 100 kilograms of load—Ed.], the line OV is the flexibility curve for the leaf spring since it realizes this proportion of deflections to loads. Assuming further, that the load on the spring is 400 kilograms when the vehicle is empty and that 600 kilograms is intended as the maximum load, the line AB denotes the position of the axle when the vehicle is empty, while C'D' similarly denotes the position of the axle at full load. Usually some form of guard is employed to prevent the chassis from striking the axle, and by this means the range of the spring action under full load may be established at about 100 millimeters, in which case the line EF indicates the position of the chassis 100 millimeters above that of the loaded axle C'D'.

To simplify the consideration of the improved spring action, which may be effected by means of spring shackles of the general type shown in Fig. 2, it may now be supposed that one of these auxiliary springs is attached at each end of the leaf spring, instead of at one end only, as usual in practice, and that in combination they have a flexibility of 20 per cent., each of them 40 per cent. They are supposed to be placed in position under a tension of 400 kilograms, or 200 kilograms for each, and consequently begin to act when this load, which is the minimum load on the whole spring combination, is exceeded either by increased load or by shock.

The diagram now shows the modification of the flexibility curve which is effected if the range of each of the auxiliary springs is limited to 30 millimeters; that is, if an additional load of 150 kilograms, bringing the total load to 550 kilograms, compresses the auxiliary coil spring completely, taking it out of action as a spring. By measuring off 20 millimeters on the vertical corresponding to a load of 500 kilograms from its point of intersection with the flexibility curve of the leaf spring, as from *b* to *a* in the diagram, the direction of the modified curve is obtained and this curve (in this case a straight line) continues to represent the flexibility of the whole spring combination until a load or shock of 550 kilograms is reached, as shown in the diagram by the dotted vertical erected to represent this load. Thereafter, the leaf spring going into unaided action, the flexibility curve returns to what it was—one of 30 per cent.—but the position of the rear axle in relation to the chassis has been changed by the compression of the coiled spring so as to reduce the distance from the axle to the chassis by 30 millimeters, PP' in the diagram, which is equal to the range of the coil spring. The line CD therefore represents the position of the axle at maximum load with auxiliary spring equipment and the point T, corresponding to a shock of 825 kilograms, shows that the range of the spring, or the deflection possible before the chassis strikes the buffer, has been reduced as compared with the maximum shock of 925 kilograms indicated by T' for the leaf spring alone. This drawback to the attachment of auxiliaries may be obviated by means of a shock absorber or an overload spring for the most severe shocks. The advantage of the equipment, on the other hand, is plainly this, that with a leaf spring properly designed for the maximum static load and too stiff for the empty or lightly loaded vehicle a flexibility curve of 50 instead of one of 30 per cent. (French notation) is obtained for just those frequently occurring instances when a full load cannot be taken on board.

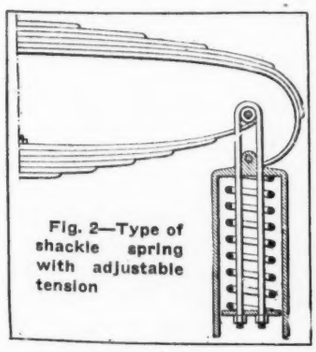


Fig. 2—Type of shackle spring with adjustable tension

If a single auxiliary spring for each leaf spring is used instead of two an examination of the conditions will readily show that, other things equal, a range twice as great and a quadrupled flexibility must of necessity be provided.

By operating at random in the attachment of shackle springs disagreeable surprises are, on the other hand, frequently encountered. The suspension is often unduly weakened; teetering of the vehicle body is produced by road shocks and at stops and starts and the vehicle holds the road badly at turns.—From *Le Génie Civil*, August 31.

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VISUALIZING the Sparks—As a high tension current is used for producing the light phenomena observed with a Crookes tube, a Parisian inventor reasoned that a Crookes tube or bulb could be made to tell from the outside whether the sparks wanted on the inside of a motor cylinder are properly and regularly produced. He devised an instrument for this purpose which has the appearance of a very thick sharpened lead pencil. The pencil point is an electrode set in hard rubber and leads to a small Crookes bulb inside of the pencil, whose surface is a thin copper jacket serving as the other terminal. At the butt end a non-conductive plug with a hole through the center is inserted in the copper tube. The observer puts his eye to this hole to see what he shall see. The pencil point is to this end placed against any exposed portion of the ignition circuit of the motor, for example the top of the spark-plug, while the observer's hand clasps the copper tube firmly to ground whatever amount of current may be able to pass the Crookes bulb. Now, when the ignition circuit is closed, to produce a spark in the motor, a light becomes visible in the pencil. If the sparks are strong and regular, so are the fluorescences of the bulb. On the other hand, if no light appears the plug is short-circuited, and if the light is irregular and weak the spark is fouled or the porcelain broken.—From *Omnia*, September 21.

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AUTOMOBILES for Children—At the exposition for "little inventors," which for some years has been held annually in Paris with a view to helping out inventors who are either too impecunious to help themselves or whose productions are so far out of the beaten industrial track that those who would be interested in them might be hard to find, there are this year shown automobiles for children. They have a 3-4 horsepower motor and their speed cannot exceed 4 kilometers per hour, not even on the downgrade. This result is accomplished by having the driving shaft actuate a low-pitch irreversible worm on the rear axle, so that the vehicle cannot push the motor. The clutch and the brakes work on the opposite plan of that followed in ordinary cars; that is, the driver must push a pedal to throw the clutch in and the brakes off. If he does nothing the car stops. This radical precaution against accidents to the children has at times been proposed for cars in general but has met with no favor among adults. It is now relied upon for making cars for young children popular.—From *Omnia*, September 21.

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PLANETARY Gear of New Type—With a view to the problem, which eventually must be solved, of driving motor vehicles—for example, municipal garbage collection vehicles—very slowly and with many stops and yet economically, it is necessary that the power used should be very small and adapted for working at high speed, so that the vehicle may not be exposed to great stresses and may be built cheaply, and it is at the same time necessary that the power taken from the high-speed shaft of the little motor shall be geared down to a very slow motion of the driving wheels without encumbering the vehicle with a large and power-consuming gear box and without a multiplicity of gear reductions at various points, all of which would mean increased first cost, waste of power, wear of a number of parts and difficulties in keeping the vehicle in good repair.

A similar problem exists with regard to motor boats and turbine boats, where there is need of a simple reducing gear because

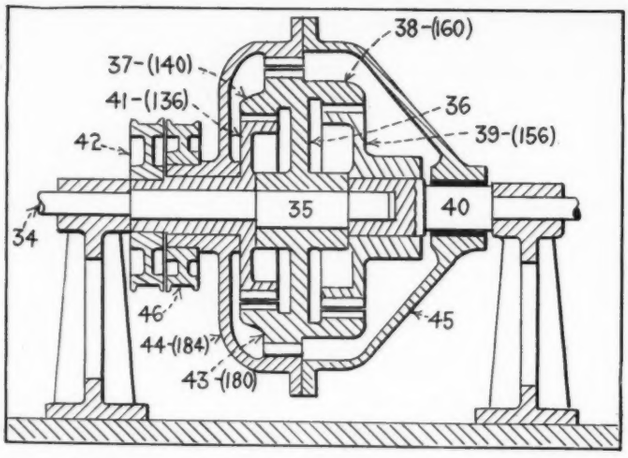

Fig. 3—Section of the Peters planetary gear for large reductions (with the number of teeth on each gear-wheel in parenthesis)

the engine operates to best advantage at high speed and the propeller at a relatively low speed. And in electric transmission the same problem appears again, in some cases reversed, the requirement being then to transform a slow movement into one of very high speed. Compactness in conjunction with great strength and facile operation for starts, stops, reversing and gear changes are in most of these cases of the greatest importance.

Consideration of this long-felt want has led in Germany to the development of a new type of planetary gear of remarkable design and mechanical properties. Fig. 3 shows a section through the driving shaft 34 of this mechanism in the form in which it has been placed in the market for use in automobiles, motor boats and turbines. The driven shaft 40 lies in prolongation of the driving shaft, being bored concentrically to receive it. Direct drive may apparently be obtained by locking together the two brake disks 42 and 46, while leaving them free to turn on the driving shaft, but the German description is silent on this point, and no locking device is shown. The construction, as illustrated, has only one reduction gear and a reverse. For each additional gear desired an additional brake disk and an additional pair of spurwheels would be required, but this complication may not be excessive as it is one of the characteristics of the mechanism that it may be made in very small dimensions and with very small gear teeth, even for the transmission of great power, as at any time at least one-third of all gear teeth are in engagement. [The engagement is not quite complete, however, but depends upon the small difference in the diameters of external spur wheels and the internal gears with which they engage, this difference barely exceeding the height of a gear tooth if great gear reductions are involved. Probably the engagement of a large number of teeth is realized closely enough for purposes of strength, considering that each tooth possesses a certain elasticity whereby great stresses will be distributed, perhaps well within the elastic limit of all the teeth involved. In this respect the use of small, thin teeth may even be of particular merit for the very special construction under consideration.—Ed.]

The middle portion 35 of the driving shaft 34 is formed eccentrically to the rest of the shaft, and on this eccentric portion is mounted the wheel 36, without being keyed, and to it there are secured the internal gear rings 37 and 38 as well as the external gear crown 43. These gears may, of course, be machined directly out of the material of wheel 36, if preferred. The spurwheel 41 is journaled upon shaft 34 and has an extended hub upon the end of which is secured the brake disk 42, by means of which this spurwheel may be held motionless. It is constantly in mesh with internal gear 37. Internal gear 38 is similarly in mesh with the spurwheel 39, and the latter is secured upon the end portion of the driven shaft 40. All driving is thus done through internal gear 38 and spurwheel 39, the forward as well as the reverse. On direct driving they are locked together. The casing within which the whole mechanism runs in oil is composed of two parts, 44 and 45, which are bolted together. During forward driving this casing revolves idly; held motionless it effects the reverse. Part 44 is formed with an internal gear constantly in mesh with spur gear 43 on wheel 36 and has an extended hub which is journaled upon the hub of spurwheel 41 and carries a brake disk 46, by means of which it may be held motionless. Part 45 is formed with a packed bearing in which the driven shaft 40 turns.

To operate the reduction gear, the brake 42 and thereby the spurwheel 41 are prevented from turning. The driving shaft, when revolving, rocks the wheel 36 around by means of the eccentric portion 35, and by each revolution of the shaft all the teeth of the stationary spurwheel 41 are thereby successively engaged by the teeth of the internal gear 37. But if the number of teeth in the internal gear is 140 while the spurwheel 41 has only 136 (as exemplified in Fig. 3, where the supposed number of gear teeth is indicated in parenthesis together with the reference numeral of each gear wheel), the internal gear 37 is compelled to turn backward an angle corresponding to four teeth for each revolution of the driving shaft, since it is only 136 teeth which corresponds to a full circle of engagement with the stationary spurwheel. The internal gear 38, being in one piece with 37, consequently also turns back the same angle and thereby drives spurwheel 39 forward, turning the shaft 40 in the same direction of rotation as that of the driving shaft. The speed reduction produced with the here supposed dimensions is now 140 to 4 in the first pair of gears and, as the internal gear 38 has 160 teeth while spurwheel 39 has 156, the total reduction is obtained by multiplying 140/4 by 156/160, giving 34 1-8 to 1. [In the German report it is figured as 312 to 1 on the supposition that the action between the last pair of gears is of the same nature as the action of the first pair, but this supposition seems to be at fault, since the four-teeth movement of gear 37, and consequently an equal angle of movement for gear 38, is an actual rotation which takes effect upon the gear 39 in the manner of ordinary gears; that is, in the proportion of the two gear diameters or that of their numbers of gear teeth, which is the same thing.—Ed.]

The reverse is effected by immobilizing the casing by means of brake 46. This forces spurwheel 43, with its 180 teeth, four teeth ahead for each revolution of the driving shaft, as for each revolution it must be engaged successively with all of the 184 teeth of internal gear 44 in the casing, on exactly the same principle which applied to forward driving excepting that wheel 36 is now turned in the opposite direction, which is the same direction as that of the driving shaft. And consequently internal gear 38 now turns the driven shaft in the reverse direction, as desired.

If more than one reduction gear are wanted, the wheel 36 is extended on the motor side to make room for more internal gears of smaller diameters and with corresponding spurwheels and brake disks, and the hubs of the latter must be journaled upon the driving shaft inside of the hub sleeves for the large spurwheel 37 and for the casing. It is stated that reductions of as low as 2 to 1 may be obtained, but it seems that in that case the gear teeth must be made relatively large or the eccentricity of portion 35 of the driving shaft more pronounced. With a rapid rotary motion of the wheel 36, as would occur with small speed reductions, the one-sided weight distribution, which would lead to vibrations, may, of course, be obviated by counterweighting this member.—From *Der Motorwagen*, September 20.

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IMPROVED Goggles—In the German market goggles in which the glasses are made of quartz are now offered as a great improvement over the ordinary kind. The optics are more perfectly colorless and transparent and so much harder that their polished surfaces never get dulled or scratched by the action of dust and grit.—From *Allgemeine Automobil-Zeitung*, No. 38. [Quartz also sheds water better than glass and clouds up less readily.—Ed.]

Patrol Bodies Specified

New York Police Department Issues Requirements as to Design and Dimensions—Also States Purchase Conditions—Cars to Seat Fourteen

THE Police Department of the City of New York has taken sufficient interest in the motor police patrol to issue special specification for bodies for them so that all orders for future motor patrols will have to meet the specifications decided upon and reproduced herewith.

According to the commissioner of the Police Department, "the department is not essentially interested in the design of the chassis or engine, but the body design as specified meets all of the needs of the department and the dimensions are satisfactory in every respect."

When purchasing these chassis the department does so under competitive contract and the manufacturer is bonded to maintain the apparatus in first-class working condition to the satisfaction of the department for a period of 2 years under penalty of revocation of the contract for failure to do so. In the contract an equitable provision is made for accident or other damage due to neglect or carelessness on the part of the department; and the chassis manufacturer has not any recourse if his chassis is out of service for 50 or more days in each year of the two protected by the bond.

In size the new vehicle shows an increase over its horse-drawn predecessor, having a total seating capacity of fourteen, the inside accommodating twelve persons, while the driver's seat provides room for two.

In the particular wagon in question the body is mounted on the Garford service chassis with a wheelbase of 145 inches. The rear wheels are of dual type. The tires on all of the wheels are 36 by 4 1-2 inches.

With regard to the body construction this is entirely in wood, ash slats forming the two interior seats arranged lengthwise, with frame and panelling of the same wood at the side, front and back to a height of 34 inches from the floor. The entire space between the upper edge of the seat back and the roof is fitted with heavy wire mesh, as are also the front and back. Provision is made to cover the whole of this mesh area with a series of roll-up blinds of black waterproof material, having transparent celluloid insertions to admit light. These blinds are arranged outside the screens.

The two seats are hinged at the rear edge to permit of their being swung up out of the way as indicated in the drawing so that in case of emergency the floor space can be utilized to accommodate an ambulance bed. A stretcher, forming part of the regular equipment is carried under one of the seats.

When used for ambulance purposes the attendants stand on the rear step, a vertical handrail being provided at each side of the door.

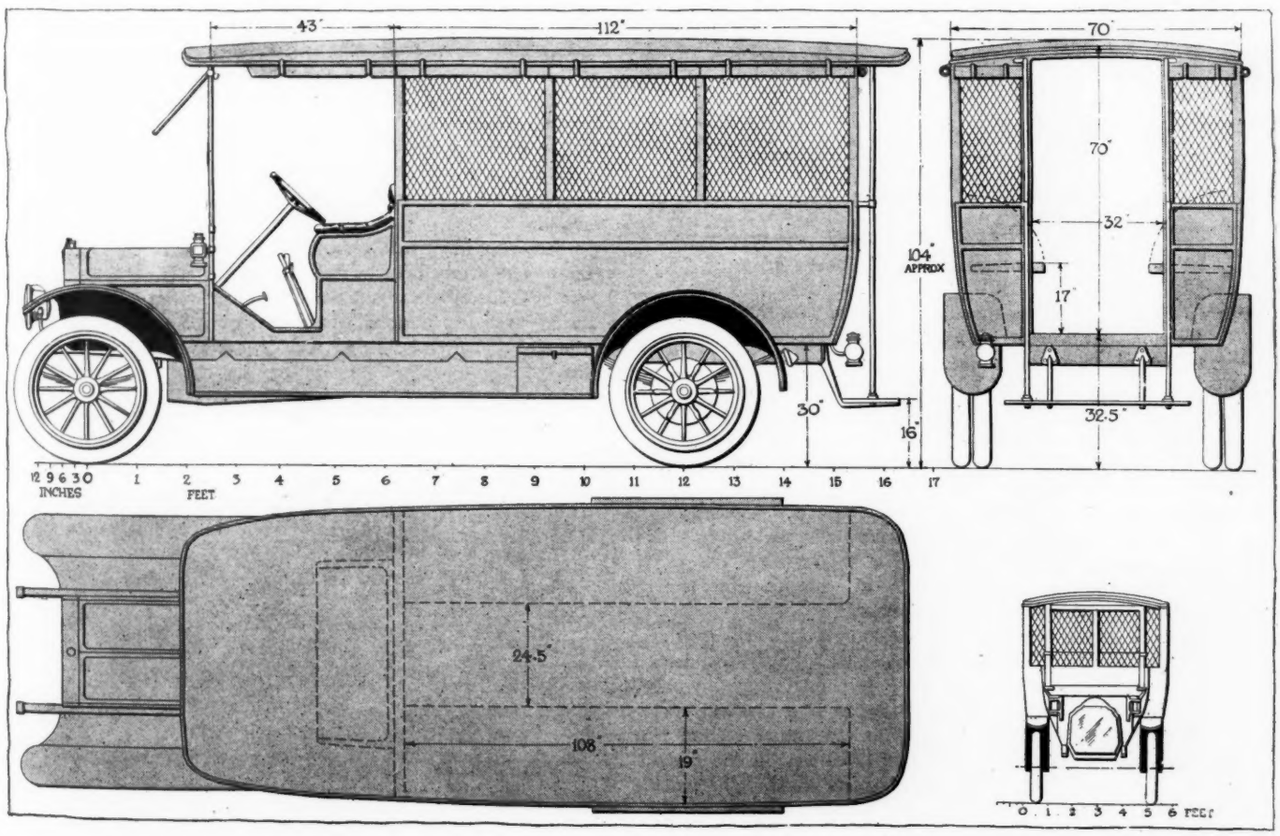
Heavy linoleum laid with brass strip binding covers the floor space, a wide tread plate being placed at the door. Emphasis may be placed here on the necessity of a clean sanitary result throughout all the interior finish, the flooring in particular.

Illumination of the interior is effected by means of a large center dome light covered with a wire mesh guard.

The only upholstery on the vehicle is on the front seat and this is of black leather tufted on both cushion and seat back. The gasoline tank is beneath this seat.

All the leading dimensions appear on the drawing, but the following particulars may be added: The weight of the complete motor-vehicle is approximately 4,200 pounds, the body itself weighing 1,000 pounds.

The speed capability of the machine is in the neighborhood of 50 miles per hour.



Style and dimensions of body specified by the Police Department of the City of New York for automobile patrols

Foreign Constructions Designs and Practices

Silent Couplings for Magneto Drive Now Insisted on by European Makers—Wood Pin Used by Many

General Observations on Shop Methods in Many of the Foreign Factories

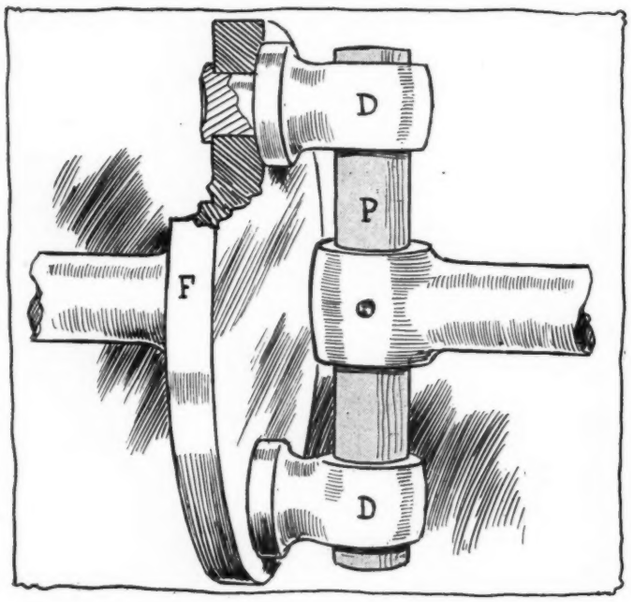


Fig. 1—Wood-pin coupling in magneto drive

EVERY effort for flexibility is recognized as a step in the direction of thwarting depreciation, but every joint has the voice of thirty little noise-devils at concert pitch. Designers in Europe think so and they govern themselves accordingly. It is no easy matter to master noise. It is equally difficult to fix the pitch and timbre of sounds that the combined murmur will not arouse the ire of the automobilist. Some makers of automobiles have the faculty of silencing noises temporarily! They put paint in the joints at every point in the chassis! Other makers destroy interchangeability by hand-fitting parts. No two automobiles are alike in this process and it is the owner who pays the bill by difficulty in replacing worn parts, and cost consequent upon such replacements.

The makers of the best types of automobiles are still looking for ways and means of eliminating noises without abating flexibility of mechanism. Fig. 1 shows a principle which is now regarded favorably. A wooden pin P is placed in the universal joint to transmit the torque. It may be of round section or rectangular and is carried in two dogs D carried in the flange F, which in turn is electrically welded to its shaft. The wood affords ample strength and gives the desired silence to the coupling.

Sprags for Truck Use Prove Necessary When Brakes Fail To Have Adequate Holding Power

Sidelights on Steel Tires, Spring Supports in France and Germany

On a street in Vienna recently a heavily loaded truck had its motion arrested by a guardian of the law in a garb that looked over-military. The street happened to be tilted in the direction of the slowly receding sun at 3 p. m. The driver of the truck accepted orders without so much as a murmur, but the truck, apparently not appreciating the interruption, began to back down the steep incline. The driver applied the brakes; they failed to hold. The situation looked serious for a moment due to the presence of a funeral procession with the head of the line perhaps a dozen yards behind the truck, but the driver instead of struggling with the brakes, tripped the sprag. The pavement was of granite block. How the sprag ever got a grip is a wonder, but it did take a hold and after stuttering a little it brought the big bulk to a standstill.

The sprag looked a little different and just a little better than the average of its kind. The illustration here offered of the sprag is clear enough to establish the fact that the angle of the sprag is favorable to good results. The hinged end is 18 inches from the ground. The bracket, in addition to being substantially made, is so placed under the side frame of the truck that the struggle of the sprag is to lift the load on the truck during the operation of snubbing the motion when the truck backs up. The sprag is short and stocky. The end is fashioned like a pinch-bar.

In America the truck sprag has not been used to any great extent. There are three or four American cities where hills are sufficiently large to warrant the use of the sprag. The sprag, in addition to being a good guardian against accident, is useful to the new driver to hold the truck on a hill while getting started again.

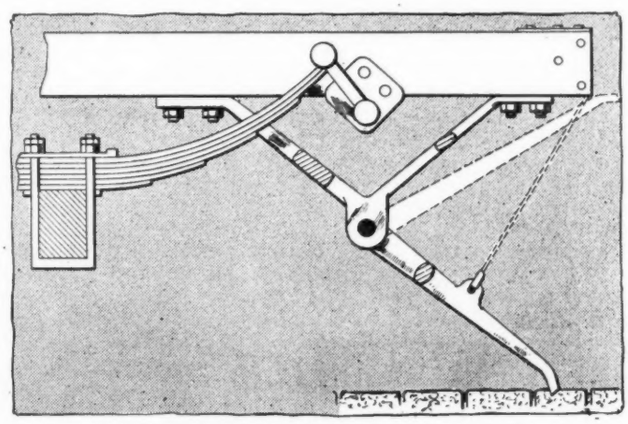


Fig. 2—Sprag design used on truck in Vienna

French Use Steel Tires on Heavy Trucks

Over 90 per cent. of all the trucks seen in actual service in Paris are fitted with steel bands instead of rubber tires. Some of the tires of steel are made narrow enough to give a high pressure of contact with the pavement to aid traction. In a few makes the steel bands are serrated. In one make observed the steel tires were wide, about 11 inches, but, instead of being plain, were drilled full of holes, each hole being about 3-4 inch in diameter. The holes soon filled almost flush with street dirt, but enough of a depression remained at the orifice of each hole to bite the pavement. Fig. 3 illustrates this tire with its steel band B and its series of three rows of circumferential holes extending three-quarters through the band.

The grade of steel used, by the way, in truck tires in France is far better than the ordinary steel obtainable on the open market. The metalloids in the steel are about one-quarter of the value as given in American specifications.

German System To Insure Good Springs

The remarkable easy-riding qualities of German railway cars make it desirable to look for the reason. The springs are responsible. They are flat springs, relatively wide, and sufficient plates are used, considering width, to make the section rectangular. In a word, a spring with a 5-inch width of plates has sufficient plates to bring the other dimensions up to 5 inches also. The same rule holds for other sizes of plates. The springs are made of long span with very little bow or camber.

The novel point is in the detail of suspension, Fig. 4, is that the mechanism used for linking the spring to its hanger H at each end is composed of a pair of links of a chain. They are sprung into grooves in the pins. One pin P1 passes through the eye of the spring, and the other pin P2 passes through the bore of the suspender. The links L1 and L2 are held in place by the pressure of the spring. This plan might be refined for use in automobile trucks.

It is extremely difficult to get hickory wood large enough to do for spokes of truck wheels of the larger sizes in Europe. Even southern white oak is scarce enough to influence the price and deliveries are uncertain. Steel wheels are being used, but they do not afford the peculiar elastic qualities of wood and the life of solid rubber tires suffers accordingly. Fig. 5 of a wood wheel seems to answer several questions. The wheel is built up—laminate of thin oak boards are glued together. The grain is alternated at right angles. After the wood is built up, it is turned round and the bore is made for the hub H. The metal work, consisting of hub and brake drum, is so made as to clamp the wood. The steel band B, 36 by 8 by 1 1-2 inches in diameter, face and thickness, respectively, is shrunk on. The wood in thin boards is easy to get. The wheel is strong and with careful workmanship there is not any danger of water getting between the boards and destroying the material. Two series of cross bolts hold the boards together, one series at the hub, the other at the periphery.

Boards for French Truck Wheels

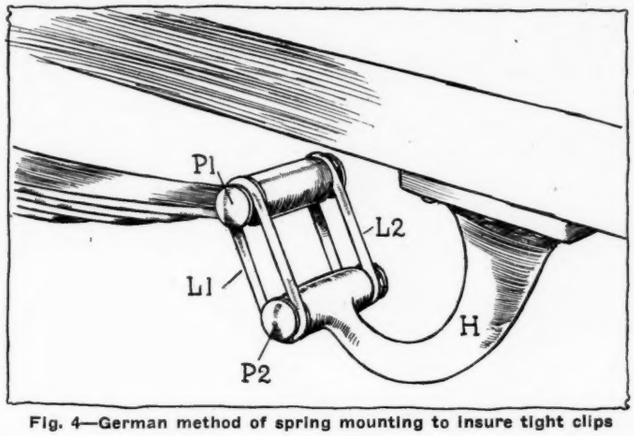


Fig. 4—German method of spring mounting to insure tight clips

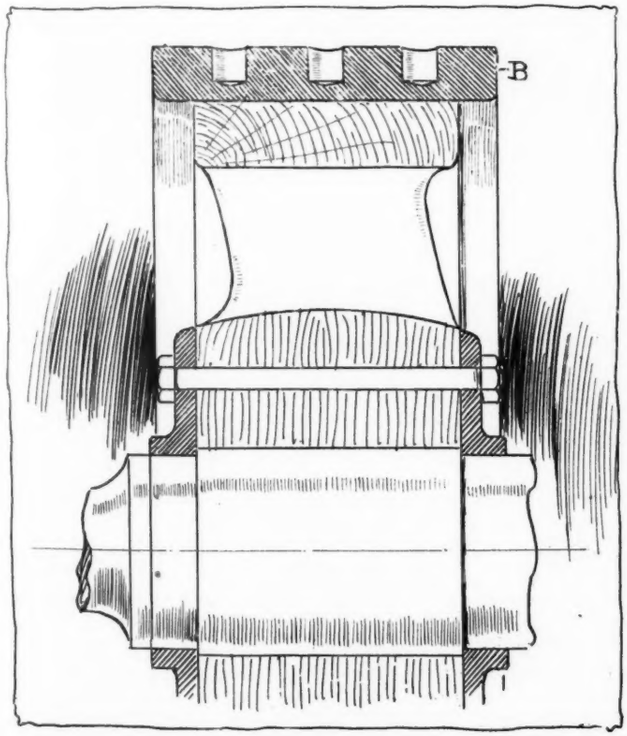


Fig. 3—One of the many French steel truck tires with anti-skid holes in band B

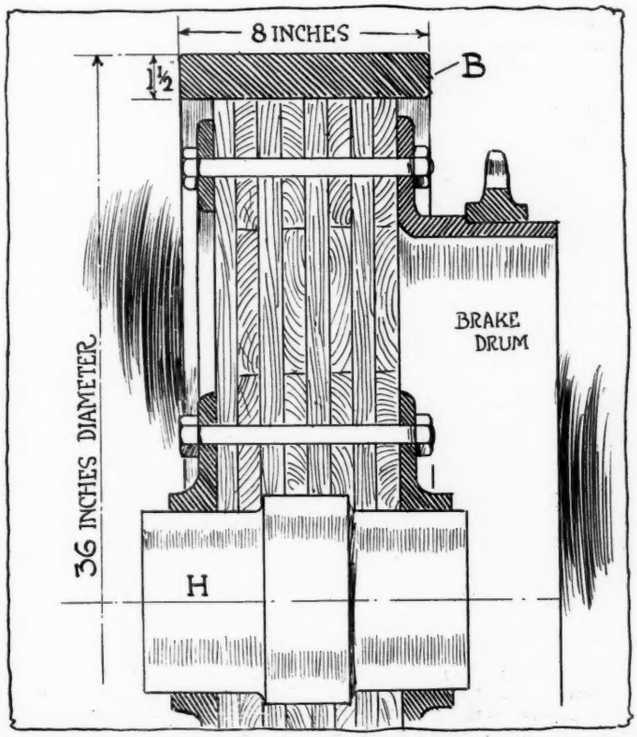


Fig. 5—European truck wheel design of lamination due to scarcity of hickory

Welding—European Methods and Uses

English Engineer Describes Various Welding Methods—Tinman's Solder, Brazing Solder, Liquid Brazing, Autogenous Welding, Electric Welding and Slow-Heat Processes

Paper read by Alexander E. Tucker, F. E. C., before the Institute of Metals, London, Eng., September 26, 1912.

THE methods in practical use for joining metals may be divided in the order of their importance as follows:

1. *By metallic cements,* such as tinman's or brazing solder, which have to be brought to the plastic or liquid state, and whose constituents should be capable of alloying perfectly with the metals to be joined.

2. *By autogenous fusing,* in which the two parts are heated and liquid metal of the same character run round the mass, or the parts are heated to fusing point, and the surfaces worked together by pressure or hammering.

3. *By the use of a cementing metal under pressure,* generally that of a rolling-mill, and at ordinary or only slightly raised temperatures.

In respect to the first method, it is obvious that the fusion point of the solder must be lower than that of the articles to be joined, and the higher the melting point the stronger the solder; it follows that it is desirable that such solder or brazing spelter should be used whenever possible, the melting point of which is only a few degrees less than that of the metals to be joined. The solder should also have, if possible, the same characteristics, such as malleability, color and hardness.

Tinman's Solder—In the use of this care should be especially taken to avoid the presence of zinc, and in certain cases even a trace of zinc is especially prejudicial; it thickens the solder, and probably on account of its liability to oxidation forms a superficial scum which the ordinary spirits of salt is incapable of dissolving. If the presence of zinc be suspected, the addition of a few drops of acid will help greatly. Antimony is frequently present in tinman's solder—this, by forming a cement of higher tensile strength, may, under special conditions, make a joint of greater strength. In the use of solder, either soft solder or brazing solder, it is clearly the correct method to raise the work to the highest temperature that the solder and the work will stand, because under such conditions the penetration of the solder into the surfaces to be joined will be better, and further, the soldering medium may then be squeezed out to the maximum from between the surfaces by suitable means, and hence the requirement can be met, that the thinner the layer of cementing material and the closer the surfaces are together, the stronger the join. Additional strength, because of the additional intimacy effected, may be given to the work by rubbing the surfaces carrying the liquid solder together; in the same way it is always well to rub the soldering iron, when possible, over the work when it is used, the wetting of the surfaces is then more perfect, and no stripping of the solder is possible when this rubbing is done. In order to obtain a lower melting point in tin solder bismuth, and sometimes cadmium, is added.

The conditions here are very different from those in the case of the brazing of brass and copper, because it happens that all the metals employed in brazing and tinman's solders destroy the character of the steel they are intended to join if they are heated sufficiently with the steel, while they have no corresponding injurious effect when used for brass or copper work.

Soft Solder Advantages

When soft solder is used the thin gauge tubing is not so likely to be spoiled by deteriorating action on the steel, or by being oxidized at the heat necessary for brazing; and, further, on account of the greater liquidity of the soft solder, it will, when properly applied, sink into the small annular space between the lugs, etc., and the tubes more completely than can be expected with the more viscous flux and brazing solder. The reasons that soft solder is not used for such work are, firstly, because the heat of the enameling stoves makes its use risky; and secondly, popular prejudice—a soft soldered frame sounding badly to the untechnical layman.

It is a common habit of workmen and amateurs who have soft soldering to do, to depend on the ordinary bit, when they might use a bunsen or blowpipe. These, in many cases, would heat the work more generally than is possible with the bit, and would allow of the penetration of the solder into the surfaces, and the subsequent squeezing out of the excess of solder.

On the other hand, many forms of soldering bits are now in use, in which a bunsen burner connected with a light flexible tube is employed to heat the bit, and the flame can be conveniently made to heat the work as well. This form of soldering iron has many advantages. One of the best fluxes I have found for ordinary soldering can be easily made by macerating flux skimmings from galvanizing pots with weak hydrochloric acid. On filtering, the solution is ready for use and is an ideal flux, because of the chloride of ammonia present with the chloride of zinc. No iron or lead is dissolved if the acid added is not in excess. Solder is often used in the form of granules or strips of various sizes, and in this form is very convenient for routine work. In the case of spectacle frames or other light articles a large amount of work can be prepared, on each of which a small piece of solder, either in the form of a granule or a strip, is placed with flux on the part to be joined. The articles are then put in a tray, which is afterwards taken to a muffle working at a convenient heat, or in same cases it is sufficient to put the work on a metal plate, heated by a gas flame or even a spirit-lamp. Brass tubes are often made by bending the strip through dies and fixing a wire of suitable composition in the overlap with borax, or the borax may be mixed with finely granulated spelter. On passing the work through a furnace to raise it to a red heat, the spelter runs perfectly and a good join is made. The flux is then dissolved off the work, and the tubes are finished by drawing through dies with or without a mandrel.

Silver Solder Is Best

The best brazing, if it may be properly so termed, is done with silver solder; thus the blading used in turbines is all fixed with silver solder. It is, of course, of the utmost importance that the small pieces used in the construction of turbine motors shall be immovably fixed and cemented in position, on account of the heat and centrifugal strain to which they are subjected. Various silver alloys are used, but they are generally about 60 of silver, 23 of copper and 17 of zinc, the flux used being borax, or borax and carbonate of soda. Such a mixture is remarkably liquid when in the molten state, and on this account penetrates interstices which ordinary brazing spelter would fail to fill.

Brazing Solder—The composition of ordinary brazing solder ranges within wide limits; the analyses of samples I have examined show a variation from 61 to 33 of copper, and 39 to 67 of zinc. The tin may vary from nil to 14 per cent., and the lead from nil to as much as 3 per cent. Any of such metals may be and are used for brazing, in accordance with the character and requirements of the work to be done. The higher the percentage of copper the higher the melting point, and the higher the percentage of tin the lighter the color. We thus have a very large series of alloys available for very varied requirements. The presence of other metals when in small amounts is often of no consequence in the brazing of brass or copper, though obviously in all cases it is very de-

sirable in important work, such as the brazing of high-pressure steam pipes or where great strength is required, that the composition of the brazing metal shall approach as closely as possible to that of the metal to be joined, as only under such conditions can the maximum strength of the joint be obtained, and it is the non-observance of these conditions which has led to disaster. The skill of the workman is often limited to the fluxing of the solder, and seldom extends to an appreciation of its composition.

When, however, we come to brazing iron and steel the importance of purity is very much greater, and I have found the presence of tin in brazing solder intended for bicycle frames to be very injurious. The explanation is probably to be found in the extraordinary deleterious effect of tin on iron and steel. It is well known that **a very small amount of tin scrap, if allowed to get into a bath of molten steel, will make it very red short, and when brazing solder containing as little as 0.5 per cent. of tin is used for brazing bicycle frames I have found that the joints are very unsatisfactory and unsafe.**

An ingenious method of making a brazed joint is by connecting the two parts to be joined with the terminals of a suitable dynamo. On account of the local resistance the two parts become heated, and if suitable brass wire is wrapped round the tube, in the case of a cycle frame, and the whole surrounded with a reducing gas, such as hydrogen or coal gas, a very perfect joint is obtained without any borax or other fluxing medium.

The reducing gas under such conditions will insure the absence of any oxide of iron or other metal used, and no previous cleaning is required. Such a method of joining has the great advantage that there is no borax to remove from the joint. On account of its great hardness this removal of borax is a serious matter, and much money has been spent on experiments to remove it by pickling and other methods. It is best removed by sand-blasting, the whole frame being so treated, leaving an excellent surface, on account of its roughness, for enameling.

Advantages of Liquid Brazing

Liquid Brazing—Several patents have been taken out for details of apparatus in which a bath of brazing spelter has been kept liquid. The parts to be joined are dipped in the molten metal, the metal being prevented from adhering to the parts that have not to be brazed by applying a coating of blacking to them. **The advantage of this method consists in the fact that less metal is used in making the joint, as so little is lost in applying it, and also the heat is general on the joint instead of being local,** and I have no doubt that on routine work the consumption of gas for heating is less than when blowpipes are use, and of course blast is not required.

A modification of brazing is the use of copper in the form of sheet or wire. Under the Simpson patents tools are thus made in which the cutting part is a small piece of high-speed or other steel, while the shank is mild steel or iron. In making, say, a lathe tool by this process, a bar of square mild steel is taken and a channel planed or milled out on it in which a suitable square piece of high-speed steel fits. The two or three sides being clean, strips of copper are fitted in with a special flux, and the whole highly heated to the fusing point of the copper. After welding, the compound tool is cleaned up and treated for hardening and tempering in the ordinary way. There are some features about this process of building up tools which seem to have considerable merit. First, if ordinary brazing were used, the hardening of many tools implies such a temperature as would often destroy an ordinary brazed point. The zinc would possibly be volatilized, which is not the case when copper alone is used, the temperature of fusion of the copper being so much higher. Secondly, it is conceivable that the weld would be considerably stronger than with an alloy of zinc, because while copper alloys to a considerable extent with iron, the same cannot be said of zinc, which therefore, under the circumstances, would become a deteriorating element. Thirdly, the saving of expensive material, such as alloy steel, must be considerable in the case of heavy machine tools, as only a small portion of metal is ever in actual use. In a sense, therefore, the shank becomes a tool-holder without the disadvantages of the latter in respect to unsteadiness, difficulty of setting, etc. The process lends itself to many interesting applications; thus milling cutters may be made having a core of mild steel instead of tool steel. Hardening and tempering such cutters is a source of much difficulty and loss through distortion and cracking, and if the compound cutters can be so produced the possible economy should be considerable. There is no doubt as to the perfection of the joint, as I have seen pieces of steel joined by the process, which, on splitting, did not part at the weld.

A process has been invented by F. Pich, Berlin, for the hard brazing of cast iron in a smith's hearth. **The patent consists in the decarburization during brazing of the cast iron surfaces to be united, and in bringing at the same time the molten brass solder into close contact with the cast iron surfaces which are decarburized, but without exposure to the air.** For the decarburization of the surfaces copper oxide is used, which is mixed with borax, as a flux, until it has the consistency of a paste. This is applied to the surfaces to be joined, which must first be carefully cleaned. The cast iron pieces are then firmly tied together with wire and heated. The borax first melts, protecting the surfaces from oxidation, and taking up any oxide that may be still clinging to them. It also precludes the attacking of the copper oxide by the oxygen of the air. As the heating proceeds the copper oxide fuses and gives up to the now red-hot surfaces its oxygen, which combines with the graphite of the cast iron forming carbon monoxide and dioxide, while the metallic copper is set free in a very finely divided state. This alloys with the brass solder as it melts when strewn on, and the new alloy combines with the decarburized iron of the surfaces which it is desired to join.

Specimens of cast iron united by this method were prepared and subjected to tensile and breaking tests, and the summary of all the results shows that when the brazing of cast iron pieces is carefully performed according to the details given by Pich, the strength of the pieces so joined is virtually equal to that of the solid material.

Aluminum Soldering Difficulties

As is well known, numerous patents have been taken out, and numerous mysterious mixtures have been advertised for the so-called soldering of aluminum. In nearly every case the result is that, while fairly satisfactory for a short time, the join failed after a time, varying from a few days to some months. One of the most severe tests to which such joins in aluminum can be subjected is that of warm steam. Joins which look well and are apparently mechanically strong, fail rapidly when submitted to this test. In all soldering, it is obvious that the flux used must efficiently clean the surfaces of the metals to be joined, otherwise no alloying of the solder used with the surfaces is possible. In the case of aluminum very few materials adapted for such fluxes are available, the requirement being that they shall absorb oxide of aluminum. Another detail of importance is the great heat conducting of the metal. **A consideration of the results obtained with all the so-called solders of aluminum shows that the metal is so susceptible to electrical action and oxidation that the use of any metal in which aluminum itself does not preponderate is hopeless. The best results have invariably been obtained when the solder was of the same composition as the material to be joined.** This condition involves the principle of autogenous soldering, which will be subsequently dealt with.

The best flux used is a mixture of alkaline aluminum chloride, with the addition of fluorides, such as potassium fluoride or calcium fluoride. When these are mixed in suitable proportions and damped with alcohol, and heated on a strip of aluminum, the surface of the metal is cleaned perfectly. It therefore follows that if two surfaces of aluminum are so cleaned, and an alloy containing a high percentage of aluminum, with such addition of other melted metal as will reduce its melting point slightly below that of pure aluminum, applied with the flux named, that a very satisfactory join will be obtained. The heat such as from a spirit-lamp or bunsen burner must, however, be applied from below the work. I have seen such joins made over a spirit-lamp which stood every test, including that of the steam test.

Difficulties arise from the presence of high percentages of aluminum in alloys in connection with soft soldering. These may be largely overcome by coating them electrically with copper. The following directions for soft soldering their alloys, containing from 5 to 10 per cent. of aluminum, have been issued by an electric smelting company:

"Cleanse well from dirt and grease. Then place the part to be soldered in a strong solution of sulphate of copper, and place in the bath a rod of soft iron, touching the parts to be joined. After a while a copper-like surface will be seen on the metal; remove from the bath, rinse quite clean and brighten the surfaces. The surfaces can then be tinned in the ordinary way."

Autogenous Welding System

The second method of joining metals referred to is that of autogenous fusion or running liquid metal of similar character on to the surfaces to be joined, and in its simplest form is very old. It is illustrated in the case of repairing broken

rolls and in lead-burning. It has been a practice for the broken surfaces of rolls to be cut away to give room for the new metal. The whole roll is then heated and hottest possible metal run into the intervening space, with suitable headers to allow of escaping gases.

The application of autogenous welding by acetylene, hydrogen, benzol, petrol or other hydrocarbon vapor to commercial purposes has extended enormously during the past few years, and constructions and work are now possible by the use of such methods, which could not be carried out by any other means; thus repair work of ferrous and non-ferrous metals is now done in every town of importance, and tubes of all sizes are made on a very large scale. For branch pipe construction the process is quite unrivaled. For high-pressure steam pipes the joints after screwing are often welded up, and metal vessels, instead of being made with folded joints, are now made with the blowpipe more cheaply and far more efficiently. Lead burning forms an excellent practice for acetylene welding, as it is fusion welding in the simplest form. It is usually carried out with hydrogen and air, and if the workman can make a good joint with and without a stick of lead, it is a very easy step for him to advance to making one of aluminum or steel, or any metal.

In practice a proportion of four volumes of acetylene to five of oxygen gives much better results than the theoretical two volumes of acetylene to five of oxygen. So important is this detail that blowpipes are now generally constructed to consistently maintain a reducing flame. Such a blowpipe is that of the Drager-Greishiem. In this blowpipe the automatic reducing valves on the cylinders are fitted with gauges, which, instead of being graduated to pressure, are marked with the thickness of the material to be welded. All, therefore, that is necessary is for the workman to adjust the springs on both regulators, so that both gases indicate the same thickness. A simple mechanical mixture is arranged on the blowpipe, making the whole apparatus very practical and convenient.

Characteristic Oxy-Acetylene Flame

A characteristic of the oxy-acetylene flame is that it indicates the correct mixture, for when the acetylene is in excess a small green cap appears over the inner cone of the flame. On reducing the oxygen there is a point at which the cap disappears. The right mixture is just at this point, and the effect is so distinct that when working with acetylene the workman has no excuse for not getting the right proportion.

If temperature were the only consideration, the oxy-acetylene process would be used in all cases in the working of thin metal, but its use requires much greater skill than the lower heat of the oxy-hydrogen flame. Then again, when a fixed acetylene generator is not available, the risk and danger of a portable generator is considerable, and in such cases for oxy-acetylene welding dissolved acetylene only should be used. On the other hand, this is very expensive and the apparatus is heavy, and it therefore follows that the oxy-hydrogen method with its complete portability is very often to be preferred, because hydrogen can be obtained in the usual bottles, and thus forms very convenient plant.

In welding metals other than iron, not only the melting point but the heat conductivity of the metal must be considered. Thus copper, with its high conductivity and its low melting point, can hardly be worked with the oxy-hydrogen flame. Indeed, for the same section as iron it requires a much more powerful oxy-acetylene flame. Brass, bronze, and indeed any metal, may be autogenously welded, and many require much less care than that for aluminium.

The conditions of success which apply to all welding with acetylene or other hydrocarbons are: 1, the use of pure gases; 2, the use of a metal rod of approximately the same composition as that of the work to be joined; 3, the thorough fusion of the inside surfaces before the additional metal is applied; 4, cleanliness of the parts, and when desirable the use of suitable dioxidizing and fluxing powders, such as charcoal and borax, and lastly, the use of a blowpipe capable of complete control in respect to size of flame and proportion of mixture. With extended experience in the autogenous joining of non-ferrous metals, it is to be expected that this method will replace ordinary brazing where quality of work is of the first importance.

It should be noticed that in consequence of the highly local heating action of acetylene, contraction strains are likely to be set up, which may be more serious than those occasioned when the whole work is heated and welded up in the smith's fire in the ordinary way. In the case of cast iron it is very desirable that such strains should be avoided by making the weld first and then reheating the mass as much as possible, and cooling slowly. With respect to steel, it has been repeatedly shown that an acetylene or electric weld should not be hammered while the weld is being made. It is well known that cracks are likely to be made by hammering the metal at a black heat, a temperature occurring quite close to the point of fusion. The work, therefore, should be allowed to cool slowly and then raised to a high temperature in the ordinary way and not by the blowpipe; the weld can in this way be much improved both in shape and strength. A good fusion weld very seldom breaks at the point of welding—indicating, therefore, that this point is stronger than the neighboring metal. I believe this is the explanation of the paradoxical effect noticed with fusion welding, that thick sections never give as high a tensile strength as thin.

Thus 1-6-inch 3 per cent. nicked steel strips gave 97 per cent. strength, 1-4-inch gave 90 per cent., while 1-inch bars broke at 60 per cent. to 70 per cent., with the fracture clear of the weld every time. Again, welded 1-2-inch copper rods drawn down to 3-8 inch in the ordinary way gave regularly 95 to 97 per cent. as compared with the original drawn rod.

Reducing Power of Aluminum

There is an interesting series of processes for the autogenous joining of metals, most of which are patented, which depend on the reducing power of aluminium. Anyone who has seen the application of the Goldschmidt or Thermit process to the joining of the ends of street car rails can hardly fail to be struck by its extreme beauty and simplicity. We have here a small steel foundry not much larger than a silk hat, from which the metal pours in a perfectly liquid state.

As showing the great heat obtainable when aluminium powder is used for welding, it may be mentioned that if a wrought-iron plate 1 inch thick is placed under the crucible, the liquid metal when tapped will burn a hole straight through it, leaving a fairly smooth edge. Experiments show that the heat of the molten metal approaches 3,000 degrees C., the temperature of the Siemens furnace being about 1600 degrees C.

This Thermit process has been applied for the repair of ship's sternposts and other large fractures, and means have been adopted for heating up the fracture surfaces to the proper temperature before pouring in the cementing iron without damaging the clean metallic surfaces. This is done by building up the moulding-box around the fracture in such a way that it may act as a flue or chimney to an outside fire worked with a compressed air-blast, which dries the sand mould and heats up the metal very rapidly. The presence of even a small trace of moisture in the mould gives rise to blowholes in the thermite iron, hence great care must be taken that the mould is as dry as possible. The repair of the sternpost of the German Lloyd steamer *Friedrich der Grosse* was effected in this way.

The only doubtful point in the process is the possible formation of internal fractures or cracks, but it is stated that in all the tests of the results fracture has invariably taken place outside the welding region.

It is very probable that in point of strength most thermite welds are superior to those electrically made, because the volume of heat is greater if not more intense, and, again, there is less risk of the original surfaces being burnt or oxidized. The thermite metal can also be adjusted to carry reducing media, which would quite eliminate any oxidizing influences.

Some Methods of Electric Welding

A third system of autogenous welding is the electric, of which two methods are in use, namely, arc welding and resistance welding.

Arc welding is applied for repairing breakages and filling up flaws in castings, while resistance welding is rapidly being adopted for the working up of metal articles, and it is common to find electric plant in operation for sheet-iron working. Two forms of machines are on the market for this purpose, one known as the spot-welding machine and another for butt-welding. In the spot-welding machine the sheets are joined at spots instead of rivets, hence the name. The electrodes are shaped in accordance with the work to be done, and are put on to the work by pressure effected by a foot-lever, and the current, which is automatically switched on at low potential, welds the parts together at that point. After removing the foot-lever the work can be moved along for welding at a new point.

The entire process is so rapid that an unskilled workman is able to make 1,000 welds per hour on plain sheets, while in the same time an experienced hand could hardly put together a quarter as many rivets. The up-and-down movement of the upper electrode may be performed automatically by means of a motor electrically worked. The electrode then

falls and rises at regular adjustable intervals, and the workman only has to move the pieces of work.

This machine may also be applied on water-tight welding. In this case the travel of the work takes place slowly, so that the points of welding lie close together, forming an unbroken seam. The edges of the sheets are completely softened and are pressed together seamlessly. Similarly, when the sheets are not too thick, and irregular shaped sections do not have to be dealt with, the spot-welding machine makes a very satisfactory weld. Thus wheel rims for cycles and motor cars can be joined perfectly by its means, while the advantage of this system for welding handles on covers, or for welding rings on cooking utensils, etc., are conspicuous. In the same way half-stampings, such as kettle spouts, make up to a very satisfactory job with seamless welding.

The last system of joining metals to which I desire to direct attention is the one in which the surfaces are not melted, but only slightly heated.

During recent years the manufacture of compound metals, such as nickel and steel, copper and steel, aluminum and copper, has become of great practical importance, and many beautiful articles are now sold for domestic purposes. The nickel steel, copper steel or nickeled zinc sheets may be obviously produced electrolytically and afterwards rolled down to gauge, allowance being of course made for the ductility of the softer metal. But another method has lately been introduced in which sheets of different metals may be joined perfectly.

The manufacture of aluminium copper sheets illustrates the process, and further is interesting from a metallurgical standpoint. One method with which I am familiar is as follows: **The copper sheet is pickled and cleaned. Aluminium powder is then brushed on by machinery, or by rubbing the surfaces with brushes or rollers of aluminum wire. A sheet of cleaned aluminium is then placed on such a surface, the two are heated and passed through rolls. The union is perfect, and hence the compound sheet may be subjected to stamping, spinning, etc., without any trace of lamination.**

In the same way copper and steel, or almost any two or any number of sheets of different metals, may be compounded. The aluminium acts as a metallic adhesive. While rolling such sheets the top surfaces are often kept oiled to retard oxidation and to obtain better finish.

A second method of making a compound sheet of different metals is that in which an oxide or sulphide of a metal which will alloy with both of the two sheets is taken and mixed with aluminium powder, and the mixture laid evenly between them. The whole is then heated to the fluxing point of the mixture and then rolled, and as the two sheets to be joined receive the full heat of the furnace in which the work is placed, it will be understood that the alloying of the metal from the mixture with the two surfaces of the sheets is very complete.

In another method, where still more heat is used, for the production of compound plate, say, of aluminium and copper, copper or other wire gauze is placed between the sheets and the interstices filled as before with aluminium powder and flux, consisting of alkaline, chloride and fluoride.

On heating the whole and rolling, the surfaces unite as before described, and probably more perfectly, because the gauze retains the flux better during the heating, and so does its work better, and is afterwards squeezed out by the rolls, while in addition there would also be the knitting or dowelling action of the gauze during rolling, which would further tend to hold the sheets together.

The use of such wire gauze would seem to be applicable to certain conditions of brazing, especially when the greatest care is necessary to produce the highest quality of work, such, for instance, as the brazing of steam pipes, to which allusion has already been made.

Factors in Carburetion of Various Automobile Fuels

From a paper by E. J. Stoddard in the September Bulletin of the Society of Automobile Engineers.

I WILL try to digest the important facts relating to carburetion as follows:

By way of laying a foundation for and illustrating what I wish to present for your consideration let us look at our materials in the first place. For our purpose we may say that air is a mixture of

	Oxygen.	Nitrogen.
By volume.....	20.81 per cent.	79.19 per cent.
By weight.....	23.10 per cent.	76.90 per cent.

We may neglect the other gases as inconsiderable.

But we think the amount of water vapor in the air does make a difference. It has been said that the engine acts quite differently on a rainy day. If the temperature is 62 degrees a cubic foot of air should weigh .0761 and a cubic foot of saturated air .075581. That is, the air is a little over .7 of a per cent. heavier than the mixture. I have figured that only .0119, or a little over 1 per cent. of the air would be displaced. Even with the air at 82 degrees it would be only $\frac{.0733}{.072267} = 1.014+$, a little over one and four-tenths per cent. heavier than the saturated mixture, and only about .0236+ or a little over 2 per cent. of the air would be displaced.

Gasoline is said to be a mixture of the lighter distillates of petroleum, mainly of the methane or paraffine series, having the general chemical formula C_nH_{2n+c}. The following table contains data relative to some of the liquid distillates from Pennsylvania petroleum, compiled from the books of Redwood and Crew on petroleum.

Name	Chemical Formula	Per Cent. of Carbon	Per Cent. Hydrogen	Boiling Point, F.	Specific Gravity	Vapor Density	
		12064	10365	87			
Pentane ..	C_5H_{12}	83.20	16.71	100	.64	2.538	22430
		9984	60156	143			
Hexane ...	C_6H_{14}	83.68	16.32	158	.676	3.053	159996 air
				165			
Heptane ..	C_7H_{16}	83.90	16.04	210	.718	3.547	
		12204	9820	247			
Octane ...	C_8H_{18}	84.17	15.83	255	.737	3.992	22025
Nonane ...	C_9H_{20}			303	.756	4.8	14792 air

If we assume that the liquid is a mixture of the above-named substances, there is still a good deal of room for variation in the proportions. If we take the heat value of its constituent parts, and my figures are correct, pentane would have a value of 22,430 B.T.U. per pound and octane 22,025, not a very great difference. When we come to figure the quantity of air required, there is apparently a greater difference, 16 pounds of air being required for pentane and 14.79 for octane.

It is desirable in testing carbureters to draw a charge of the mixture from the intake pipe and find out of what it is composed. I have tried, taking a given volume of mixture and dissolving out the hydrocarbon with olive oil, noting the diminution of volume. I have not had satisfactory results so far, perhaps because of imperfect apparatus. I believe the chemists use alcohol to dissolve out the heavy hydrocarbons, afterward removing the alcohol vapor with water (Hempel's Gas Analysis). If gasoline vapor is three times as heavy as air, we may estimate roughly the relative volumes of gasoline vapor and air in a 16 to 1 mixture as $\frac{13 \times \frac{1}{3}}{46 \times 13} = \frac{1}{16 \times 3} = \frac{1}{48}$, or about 2 per cent. Now I think we would want to distinguish a one-tenth variation anyway, and therefore with this method, if it worked perfectly, we would want to distinguish clearly a variation of one-fifth per cent., a fineness of measurement that makes me distrust it. I have thought we might measure the degree of saturation thus: Suppose we put some pure air into a receptacle, introduce sufficient gasoline to saturate it with vapor, and note that the water column rises and stops at 60 inches of water. We know that this is the saturation pressure. Now if we put into a similar vessel the mixture to be estimated and then introduce gasoline as before and note that the water column now rises to 44 degrees instead of 60 we would think that the mixture was $\frac{60-44}{60} = \frac{4}{15}$ saturated. It would seem that this was somewhat more hopeful. Now suppose we take a cubic foot of gas from the intake pipe during the operation of the engine. This might weigh .0777 pound and one-sixteenth of it would be about .00486 of a pound. If we take 22,000 B.T.U. as the heat value of gasoline, $22{,}000 \times .00486 = 106.92$ B.T.U., a value that could be easily read to a small fraction of a per cent. Even a much smaller quantity of mixture might be taken. For instance, a gallon, 231 cubic inches, which would contain about 14 B.T.U., is sufficiently large to measure. It seems to me that by this latter method the quantity of gasoline in any mixture may be measured with sufficient accuracy.

Multiple Series Connection Makes Batteries Last; What Is the Cause of Tire Wear? Best Flux for Cast Iron; How to Put on Hub Caps; Curing Squeaky Springs; What to Do When Entering Canada

Shape of Typical Curve

EDITOR THE AUTOMOBILE:—What should be the shape of a horsepower curve? Recently in some brake tests that I made upon a motor upon which I have been experimenting I got a series of results which gave me almost a straight line. Is this correct? Will THE AUTOMOBILE publish a curve which has been reached through actual brake tests on a well-known motor. Such a curve should show at what speed the power falls off when the revolutions per minute get too high.

New York City. INVESTIGATOR.

—This curve for the Packard 48 motor is reproduced at Fig. 1. It shows how the power increases on a straight line practically from 300 to 1,200 revolutions per minute. That means that the power is increasing directly at the motor speed. Above this point the power does not increase as rapidly as does the motor speed and the curve begins to flatten until at 1,700 revolutions per minute it starts to fall off.

Recommends Multiple-Series

Editor THE AUTOMOBILE:—On page 587 of your September 19 issue you answered a question of C. W. Cauthorn's relative to the number of dry cells to use with a Splitdorf coil. As you have stated, this coil is designed to operate on about 6 volts and therefore not more than five new cells connected in series should be used on it.

I would like to call Mr. Cauthorn's attention to a characteristic of dry cells, which, if taken advantage of, will save him a good deal of money in renewals. It is generally known that if a dry battery is allowed to stand idle for a few hours after hard usage it will "pick up" or "recuperate" to nearly the same current value that it had before. The reason for this is purely chemical—certain reactions within the cell requiring some time

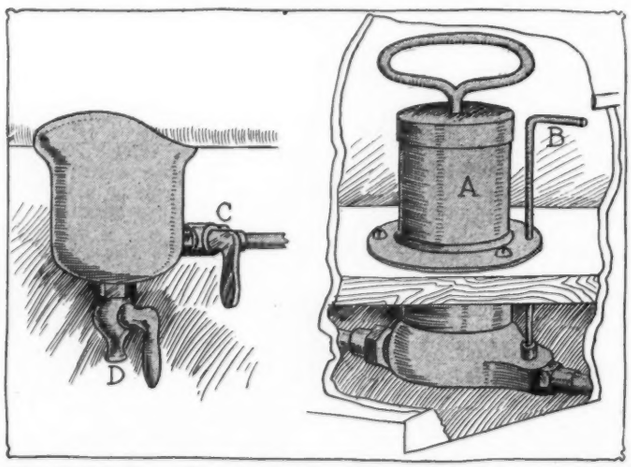


Fig. 2—Oil shut off cocks and auxiliary hand oil pump on the Hudson car

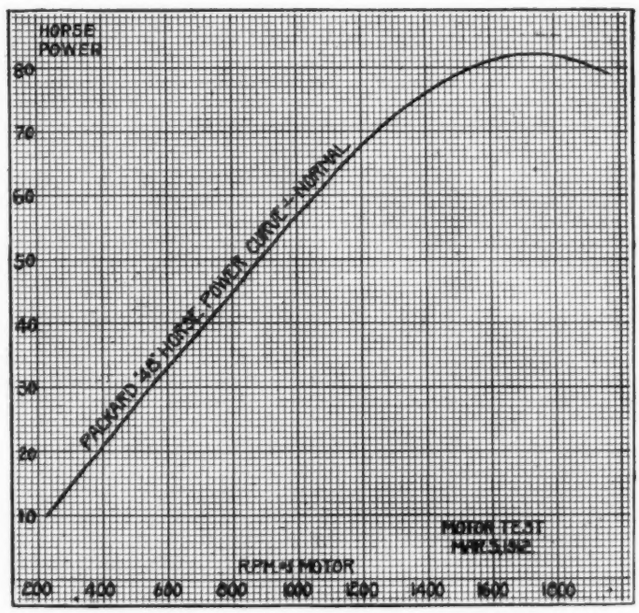


Fig. 1—Characteristic horsepower curve as result of tests on Packard 48 motor

to take place. If this time is not allowed, much of the possible service from the battery will be lost. Upon this depends the fact that two sets of cells connected in multiple, as shown in Fig. 5, will give considerably more than twice the service of one set, and three sets so connected, as shown in Fig. 5, will last nearly five times as long as one set.

Actual service tests have shown that if one set of five cells in series will run a car approximately 500 miles, two such sets connected in multiple will operate it 1,400 miles and three sets 2,400 miles.

It is obvious then that besides being more reliable, considerable money can be saved by using three sets of cells connected in series-multiple at a time. The gain with four sets is not so marked, and the additional space they take up argues against the use of more than three sets. These can be bought packed in a case with the connections made and spaces filled with waterproofing compound, if desired, at a slightly advanced price.

Cleveland, O. V. A. CLARKE.

What Causes Tires to Wear

Editor THE AUTOMOBILE:—Has any one ever compiled data on the causes of tire casing wear? I think it would be interesting to know why the average tire wears out. Is it due to the negligence of the owner or is it due to the normal wear and tear encountered on an ordinary tour? Can THE AUTOMOBILE

tell us anything regarding this important and interesting matter?

New York City. OSCAR TROUTE.

—There have been several independent investigations regarding this matter made by different authorities, but the results have varied considerably owing to the difficulties in obtaining detailed information from a large number of individual casings and tubes. Taking an average of some compilations which have been recently made, it is shown that the percentage of tires that had passed their period of usefulness through normal wear was not in excess of forty for the casings or tubes. This means that 60 per cent. of all the tires have been consigned to the scrap heap because they have suffered neglect or damages which need not have been encountered in ordinary work. It is a fact that many casings have deteriorated to a marked extent before they are ever placed upon the rim. This may be either due to the carelessness of the dealer who handled the tire or the owner who did not take the pains to keep the rubber away from the destructive effects of heat, light, oil and all other agencies to which the tire is susceptible. Taking casing trouble as being the greatest bother to automobilists that now exists, the following percentage table was given some time ago by an authority:

Normal wear	36.0	per cent.
Perforation by nails, etc.	26.5	" "
Under inflation	16.5	" "
Small cuts	5.8	" "
Layers destroyed	5.6	" "
Damaged by oil	3.8	" "
Rusty and dented rims	3.8	" "
Sudden breaking	1.5	" "
Shifting on rim	1.5	" "

This does not take into consideration the factor of overload which the experts of the tire factories state is responsible for the early demise of so many of the tires. That this factor of overloading is important is evidenced by the fact that many of the tire companies have brought out oversize models which fit the regular rims, thus giving a tire that will wear for a considerably longer period. In buying the oversize tires the consumer should use judgment as they are higher in first cost and should the tires he is using on his car regularly be of sufficient size to give satisfaction it is to be doubted if the oversize will make up in additional mileage for the added cost. Many cars of late have been overtired by their makers for the purpose of cutting down on tire trouble for the consumer. On these cars there is no necessity of buying larger tires.

The way for the owner to get the best service from his tires is to weigh the car and then get tires which are recommended by the tire makers for a car of that weight. The practice of weighing the front and rear axle loads is a good one for then the tire could be designed for the axle carrying the greater load. The practice of taking tires of different sizes for the front and rear axles is not a good one because it is then necessary to carry two complete sets of extra casings when on a tour. Besides the trouble with the carrying of the extra shoes there would be the necessity of having spare tubes for each tire.

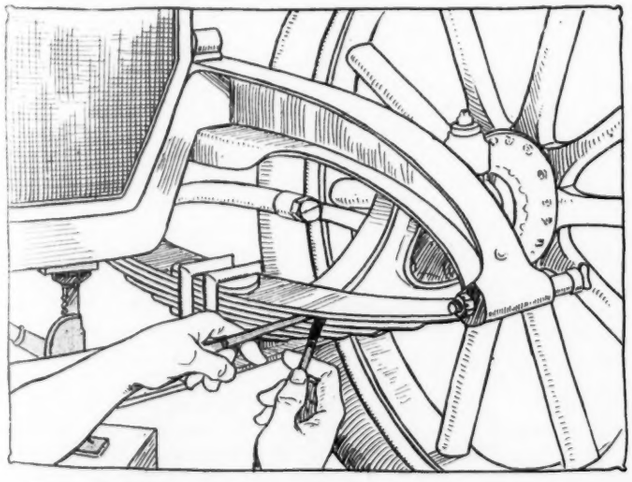


Fig. 4—Showing how to get at the springs of a car to insert graphite

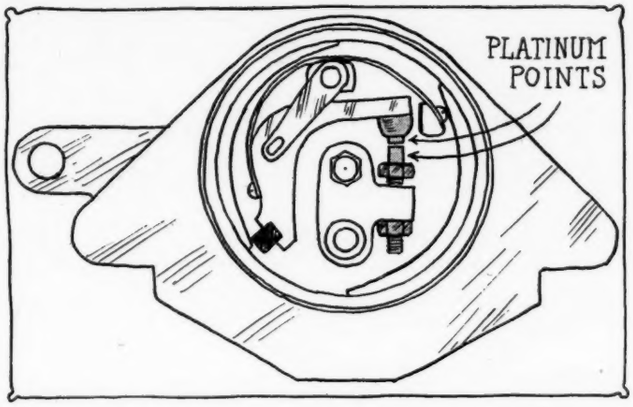


Fig. 3—Breaker box mechanism of the Bosch, showing adjustment points

Easy Way to Break Hub Caps

Editor THE AUTOMOBILE:—The hub caps on my Hupmobile runabout cost 80 cents apiece. They are light stampings and are very easily breakable by any method whatsoever, but I believe I have discovered the quickest way to run up a fairly good-sized bill for these caps alone. Twice I have attempted to tighten a cap which had a habit of dropping off, so that it would not do so again. I found that owing to the peculiar shape of the cap I could get a good grip on it with my wrench by slipping the latter over the outside flange Fig. 7. A very small amount of pressure exerted this way was sufficient to break the cap. In putting on these caps one should be particular to put the wrench on the nut part of the cap and tighten at this point. Too great a pressure applied at the nut will shear this off also, it must be remembered, and when a hub cap exhibits a tendency to drop off frequently, it should be examined to see if there is not some end thrust upon it which develops this tendency.

New York City. HUPOWNER.

Requirements for Entering Canada

Editor THE AUTOMOBILE:—I am going to take a short trip into Canada. Is it necessary to pay duty when going through the lines or can I make some agreement as to the fact that I am to return within a period of a month bringing the car with me, of course. I know that some such arrangement can be made while taking a car abroad and I would like to know if I am compelled to spend a large sum of money for customs duty in going into Canada.

Malone, N. Y. CHESTER WILKE.

—Automobiles not manufactured in Canada may be admitted under bond or cash deposit for a period of 90 days. This is provided that the owner accompanies the machine and that the owner is not engaged in any automobile business or that the car is not to be used in any business undertaking of any nature during the time that it is within the country. The requirements are as follows:

(a) The automobile shall be reported on form approved in duplicate at the Customs House at the port of importation where a careful examination and appraisal will be made.

(b) An invoice showing the selling price of the automobile will be produced (when practicable) as an aid to the customs collector in determining the value of the machine.

(c) Upon receiving a cash deposit of $25 and a bond executed in Canada in approved form for double the estimated duties,

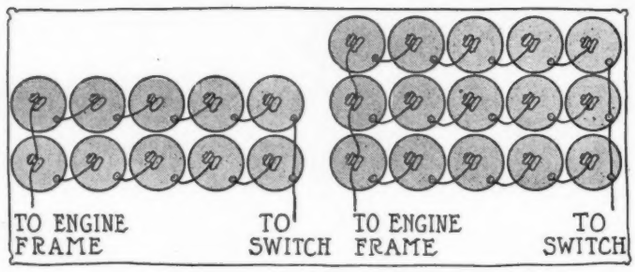


Fig. 5—Battery sets recommended for long endurance by Cleveland man

conditional for the due exportation of the automobile covered thereby within three months of the date of the bond, the collector may grant a permit accordingly (to be indorsed on the duplicate report) for the use of the automobile in Canada for touring purposes.

(d) The bond shall be signed by the importer and by two residents of Canada; or by the importer and by a resident of Canada who has deposited with the collector of the port of entry the general guarantee of an incorporated guarantee company authorized to do business in Canada, and which guarantee is then available as a security in the case; provided:

That the special bond of an incorporated guarantee company authorized to do business in Canada may also be accepted, in a proved form, instead of the bond first herein mentioned, and that the cash deposit of $25 may be dispensed with in any case covered by a special or general guarantee bond.

(e) The bond shall be filed by the collector with the tourist report attached, and the duplicate report shall be handed to the tourist with permit and receipt for deposit indorsed thereon.

(f) The deposit shall be subject to refund by the collector upon return of the permit with proof of the exportation of the automobile within three months of the date of bond. In default of the exportation of the automobile with proof of such exportation to the satisfaction of the collector within three months of the date of importation, the deposit is to be entered as customs duty and the provisions of the bond enforced.

Registration, license tags, temporary importation papers, bonds, etc., can be secured in advance through the Secretary's office so that the tourist will have everything necessary to pass into and tour Canada before he leaves his home city.

Tourists who wish to enter Canada for a period of not more than 7 days can obtain a Customs card at the Customs House at the port of entry and thus avoid the usual Customs formalities. They are not permitted to go beyond the limits of the port of entry and must return to the United States through the same port and must be known to the Customs Collector.

Some Points on Hudson Car

Editor THE AUTOMOBILE:—I am driving a Hudson 33 roadster, 1912, which I have recently purchased second-hand. There are several points about the car which are not clear to me and as I am not a mechanic I do not wish to take anything apart that I am apt to have trouble in putting together again. Among the details with which I am not familiar are the adjustments which are necessary from time to time in the valve and ignition systems and also the lubricating system which includes the use of an auxiliary hand pump which I believe is for the purpose of helping out the regular supply of oil should the car be subjected to hard work as in climbing steep, long hills, etc. Would you please touch a few of the salient features which it is necessary that I understand and tell me how the systems I have mentioned above operate?

New York City. NEW OWNER.

—The adjustments which have to be made on a motor car, even from time to time, are very few. Many cars are run throughout a season without a single change of adjustment in any parts. Regarding your specific inquiries regarding the changes of adjustment necessary in the valve and ignition system, however, a few remarks may be made which will tend to show when these changes are necessary and how to make them.

Taking the valves first, there are two points of wear on a valve. One is where the valve stem strikes the tappet, or, in other words, the bottom of the valve stem and the other is at the point where the valve seats. The wear at these two points is due to different causes, one being the wear of service, while the other is what may be called a deliberate wear. The bottom of the valve stem wears slowly because it continually strikes the tappet in performing the functions for which it is designed. When traveling at high speed, especially if the cam is somewhat square in shape, the movement of the stem takes the form of a sharp blow. In spite of the hard and excellent metal of which the stem is made it will wear away under these repeated blows in the same way that granite will wear away beneath

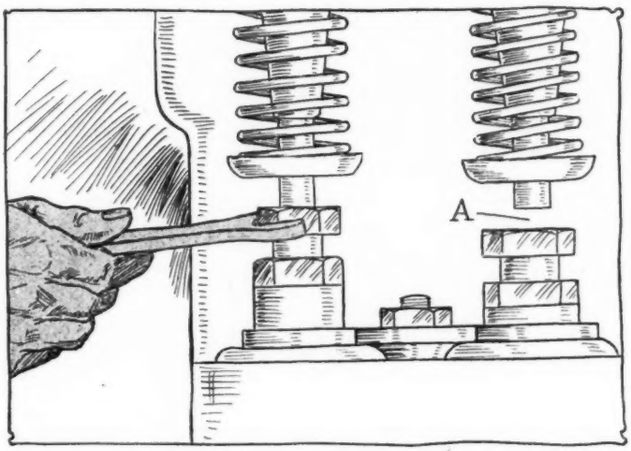


Fig. 6—Method of adjusting tappets on the Hudson 33 roadster model

the repeated drops of water. The wear on the valve at the seat is caused by an entirely different matter. After being subjected to the heat of combustion for a long time the metal around the flame-swept seat will become pitted. It is necessary to grind away the metal of the valve in doing this. Both these sources of wear will tend to equalize each other. As the valves and seat are ground away it will allow the stem to drop lower, while the wear on the stem itself will shorten this part of the valve and equalize the drop due to grinding. Should grinding be necessary very frequently, or should the stem not wear away rapidly on account of the exceptionally hard metal of which it is composed, the valve stems will need adjustment. On nearly every car made this adjustment is regulated by a nut on the tappet or valve stem. As shown in Fig. 6, a turn of the wrench will make the required adjustment. The motor should be turned over until the valve is entirely down. This can be determined by watching the bottom of the valve stem while the crank is slowly turned until the space at A, Fig. 6, on the valve to be adjusted, is a maximum. The nut should then be turned until the space at A is about .002 inch, or the thickness of a sheet of paper. This adjustment must be made when the motor is cold as the space is only left for the purpose of allowing the valve stem to have room to expand when the motor becomes warm. A good way to test the space is to slip a sheet of thin paper in the space between the tappet and the valve stem and then tighten up on the nut until the paper is just pinched. Then back off the nut a little so it is possible to just withdraw the paper.

Regarding the ignition system, the less you touch it the better. There is one point, however, in the breaker box mechanism that will perhaps require adjustment occasionally. This is shown in Fig. 3, which is a sketch of the breaker box. You will notice on the flywheel of your car a line drawn on the rim with the letters MAG. marked upon it. When this point on the

flywheel registers with the pointer on the rear of the motor, the two platinum points should be separating. If the points break too late or too soon, loosen the setscrew on the magneto coupling and turn the magneto shaft by hand until the points are just breaking when the flywheel is in the proper position. Be sure that the order of the spark-plugs is not disarranged. The Hudson car fires in the order 1, 3, 4, 2 counting from the front end of the motor. Batteries are used for starting and these should be tested with a voltmeter occasionally. Six volts is required to adequately meet the needs of the ignition system, while below 4 volts the latter will become inoperative. Another point in regard to the platinum points in the breaker box which should receive attention every few months is that the magneto key furnished with the car should be used to gauge the distance between the points. These should separate the distance indicated by this gauge. As will be noted in the illustration the contact points are fitted with means of adjustment.

The oiling system of the car is not hard to understand. The chain oil supply is carried in the crankcase, while the auxiliary supply is in the tank mounted on the rear of the roadster. The oil is pumped from the crankcase reservoir to a trough-like formation in the crankcase casting. One of these troughs is located beneath each cylinder and as the connecting-rod reaches the bottom of the stroke it plunges into the trough and throws the oil up into the cylinder lubricating them thoroughly besides also sending a spray of oil to the camshaft and other bearings. The pump of which you speak sends an extra supply of oil to the crankcase reservoir to take care of a shortage in supply here or to replenish the supply in case more oil is necessary for heavy work, such as hill-climbing. A is the body of the pump in Fig.

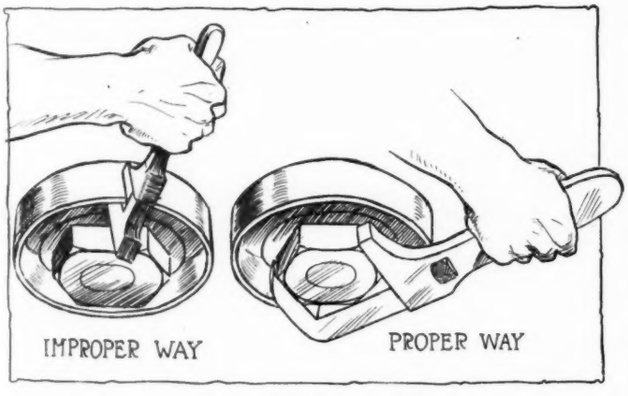


Fig. 7—Two ways of tightening a hub cap with a wrench—bad and good

2 and it is actuated by the handle above it. B is the handle for shutting off the supply from the oil tank. On the bottom of the tank at D is the oil drain, while C is the shut-off from the oil tank to the hand pump.

New Gear Causes Bad Knock

Editor THE AUTOMOBILE:—After having an exhaust cam gear put in my machine, a very bad knock has developed which cannot be stopped by advancing or retarding the spark. While the engine is running idle there is a slight knock which stops instantly if pressure is applied to the shaft which runs magneto and water pump. This seems to indicate that there is play somewhere in timing gears. The exhaust cam gear meshes with magneto gear. When pulling the slightest load there is a very bad knocking and also loss of power. Do you think by putting a new magneto gear in, that it will stop knocking? Or, if not, can you help me in any way to remedy my difficulties?

Garthersburg, Mo. D. B. DIAMOND.

—The trouble is that the two gears do not mesh correctly. The teeth of the two gears should come together as in Fig. 8 while they are probably in bad mesh as shown in Fig. 8. Every time the motor speed changes the two gears which do not properly mesh together come against each other with a sharp impact that is sufficient to produce a heavy rapping sound. This is also the cause of the loss of power. The valve timing will change at every change in relationship between the gear on the end of the crankshaft and the new camshaft gear. At times the valves will not close soon enough and a loss of compression will ensue. A new timing gear that fits will cure the trouble by taking up the lost motion.

Eliminating Bad Spring Squeak

Editor THE AUTOMOBILE:—For some time the left front spring on my car has troubled me by keeping up a continued squeak when traveling over any road that is not as smooth as new asphalt. I have kept the shackles well greased and yet that does not seem to do any good as the noise still continues. I have come to the conclusion that the noise comes from between the leaves of the spring and would like to know if this could possibly be so and how to cure it if it is.

New Haven, Conn. WALTER AMES.

—The answer to the question is simply lubrication. Good graphite, which can be secured from any of the supply houses, is the best lubricant for springs because it will stay in place and will not require renewal for a long time. The method of inserting the graphite between the leaves will be seen in Fig. 4. The car is jacked up under the front member of the frame so that all the weight is taken from the springs. The leaves will then have a tendency to separate. A chisel or any solid piece of metal may be used to still further pry the leaves apart while they are painted with the graphite. If the spring seems to be in rather bad condition it would be well to take it off the clips and remove all but the top leaf, which is held in place by the shackles. These can be left undisturbed as it will be simple to clean this leaf while it is still on the car. Clean the leaves thoroughly with kerosene and then wipe them dry. After this coat them quickly with graphite and reassemble them. This will take the squeak out of the spring and leave it in perfect condition. The springs require this treatment once a season and if it is done in the fall, before the car is put up for the winter, the squeaks which often issue from the springs when the car is taken out for the next summer's season will not be present.

Soldering Cast Iron

Editor THE AUTOMOBILE:—Would you please tell me if there is a flux that is suitable for use with cast iron, such as the waterjacket of a cylinder?

Masontown, Pa. CLARENCE KOEPFE.

—If you have a cracked waterjacket it would be much more satisfactory to take this to a welding company and have a good, careful job done upon it than to trust to simple soldering work. A flux which can be used to solder the waterjacket of a cast-iron cylinder is cut muriatic acid, that is, hydrochloric acid in which zinc has been dissolved. For tinning, use four parts of sal ammoniac solution in water and one part of hot hydrochloric acid. The action can be improved somewhat by sprinkling a little powdered sal ammoniac on the surface. When the welding is done by the oxy-acetylene process a good clean job that you rely upon will result. With the soldering job the chances are that it will start to leak again in a short time.

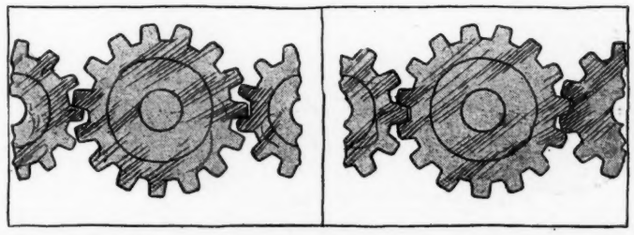


Fig. 8—Showing the cause of a knock in the timing gears, also proper mesh

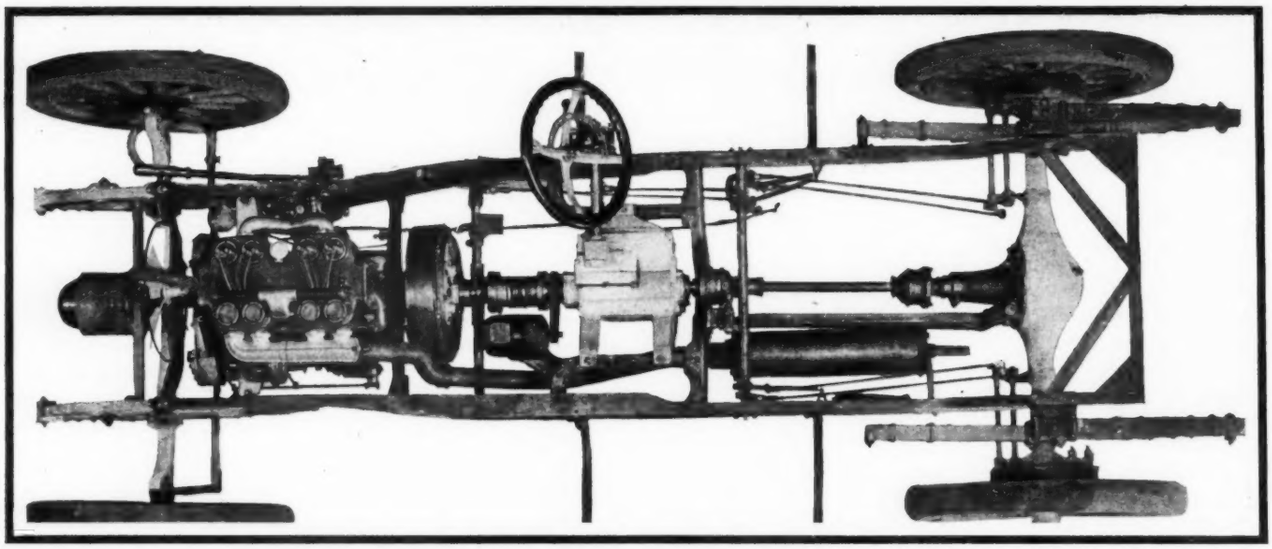


Fig. 1—Plan view of four-cylinder, 40-horsepower Klinekar, showing mounting of Rushmore lighting dynamo and Ever-Ready self-starter

Kline Adds Coupé Model

Special Body Construction Permits of Change from Coupé to Torpedo Roadster in 10 Minutes

Adoption of Ever-Ready Starter and Rushmore Lighting Dynamo Mark 1913 Line

FOR 1913 the Kline Motor Car Corporation, York, Pa., manufactures the same four chassis models as in 1912, a few minor changes having been made in the way of refinements in promoting silence and ease of mechanical operation and comfort in riding. The company has also brought out a special body type which is practically new to the trade. This is a combination coupé and roadster, the coupé top being removable in 10 minutes, leaving a fully finished torpedo runabout of distinctive appearance. This body is furnished on the 4-40, 6-50 or 6-60 chassis as specified, the only model of the line for which it is not adaptable being the 4-30. These four chassis models constitute Series A, the Kline company having adopted the series system of manufacture for the coming season.

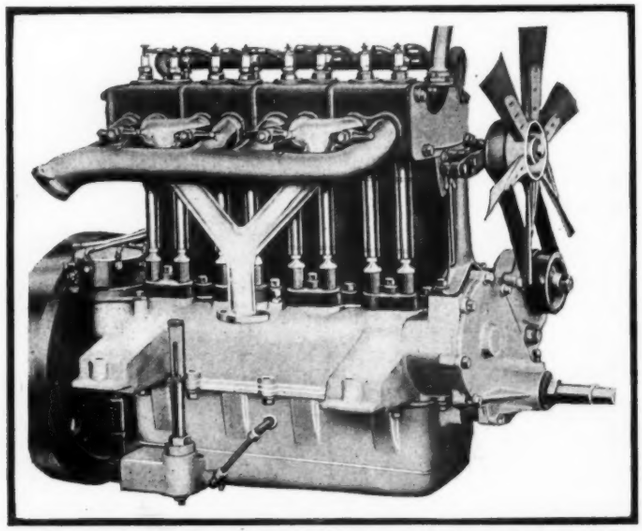


Fig. 2—Right side of Kline 4-30 motor, showing inclosed valves

Mechanical changes in the Klinekars for the coming season are all of a minor nature, the new features being: The inclosing of both intake and exhaust valves on all motors; the addition of a Rushmore dynamo for the electric lighting system; the adoption of the Ever-Ready automatic mechanical self-starter; some slight modifications in the sizes of springs and tires; use of cork inserts in the clutch instead of the spring inserts used in the 1912 cars; an auxiliary spring construction has also been adopted in the rear. A three-way valve connecting the gasoline tank with the motor is regulated from the side of the car, rendering it unnecessary to crawl under the car to change the fuel connections. All bodies for the 1913 cars are made in the Kline shops and are of combination steel and wood instead of semi-aluminum as in 1912.

There is no change in any of the motors outside of inclosing the valves. The horsepower of all motors is calculated at 1,200 revolutions per minute, except the 4-30, which is taken at 1,100 revolutions per minute. Motor dimensions are as follows:

Model	Cylinders	Bore	Stroke	Horsepower
6-60	6	4¼	5½	60
6-50	6	4 3/32	5	50
4-40	4	4¼	5½	40
4-30	4	4	4⅝	30

All motors are of the long-stroke, water-cooled type and are constructed on the separable enbloc system, the cylinders being cast single or double according to the model. Thus any cylinder may be removed and placed without disturbing the others, it being possible to take out the cylinders separately without removing the motor from the car, or the cylinders can be removed as a unit. Should a new cylinder be needed, it can be substituted for the old one without disturbing the rest of the motor. As each cylinder is opened at either end it is possible to obtain a large and well-gauged water space between the cylinder and the waterjacket. After the cylinders have been machined, they are bolted together with six bolts made of special stock designed to resist rust. These run through the waterjackets, the joints being made tight by paper gaskets, while the opening between the cylinders does away with water pipe connections between them, as shown in the accompanying illustrations of the various motors. As the water enters at the forward end of the motor and is forced out of the waterjacket of the rear cylinder up to the radiator, moreover, this has the advantage of insuring free circulation. Contrary to the general application of the enbloc system, there is a bearing between each cylinder, designed to render the motor much more rigid while at the same time making the construction lighter. Thus, in the case of the six-cylinder

motors, the crankshaft has seven bearings, and in the four-cylinder motors five crankshaft bearings are used.

Close-grained gray iron of specially selected stock is used for the cylinders of all motors. Before the cylinders are assembled in the motors, each one is subjected to a severe hydraulic test under high pressure. If any defects or flaws exist this will bring them out and the cylinder is rejected.

In grinding the cylinders, every precaution possible is observed to insure accuracy in every case. Specially selected gray iron is also used for pistons and piston rings. These are ground on both diameters and sides and are made interchangeable. Piston pins are of large diameter and are hardened and ground. Positive lubrication of the pins is secured by making them hollow.

A feature of the 1913 cars is the fact that all valves are inclosed, as shown in the accompanying illustrations of the various motors. The valve casings are of aluminum, entirely dustproof and easily removable. All valves are interchangeable. The heads of the valves are of nickel steel and are of large diameter. Integral stems, of carbon steel accurately ground, are used. The valves are operated by a drop-forged camshaft with cams keyed and pinned. They are case-hardened and ground accurately to size. The camshafts are housed in the crankcase. The push rods used are of the sliding type with large bearing surfaces, the adjusting nuts being drilled and fiber inserted. This, of course, renders the rods silent in operation and provides a sliding contact on the cam practically without friction. The whole construction tends to insure positiveness and silence in the valve action.

All motors are mounted on a three-point suspension, except the 4-30, which is mounted on a subframe.

The crankshaft used in all motors is of special carbon steel, drop-forged and double heat-treated, all bearing surfaces being ground to exact size. All crankshaft bearings are of Parson's white brass and all are adjustable.

Connecting-rods are of drop-forged nickel steel. Crank pin bearings are bushed with Parson's white brass, while the piston pin bearings are bushed with Cramp's special bronze.

A special aluminum casting is used for the crankcase, the forward supporting arms being cast integral on all models, with the exception of the 4-30, which, being mounted on a subframe, requires different construction. The half-time gearcase forms an integral casting with the engine base and entirely incloses the gears, insuring protection from grime and dust. The bottom section of the crankcase contains an oil reservoir and is easily removed for the purpose of making adjustments or inspecting the crankshaft, connecting-rods, or main bearings.

Two separate systems of ignition are used, the first consisting of dry batteries and a single-unit coil on the dash with a switch on the steering column (except on the 4-30), with high-tension distributor and separate spark-plugs, while the second comprises a Bosch high-tension magneto with a separate set of spark-plugs.

The method of supporting and driving the magneto is shown in the illustration of the 4-40 motor, Fig. 4, the base plate of the instrument being attached to the left side of the crankcase, the same shaft driving the water pump and fan. A positive universal coupling forms a direct connection between the gear-driven pump shaft and the magneto. The distributer is located between the cylinders, as can be seen in the same illustration of the 4-40 motor, where it is shown between the magneto and the water pump. It is driven by spiral gears from the time shaft with a vertical shaft running in bronze bearings. The distributer is inclosed in a dustproof hard-rubber cover. It has but one adjustment and but one point of contact for either the four or six-cylinder motors.

In advancing or retarding the spark the central post is the only movement, thus doing away with the primary or secondary wire breaking at the terminals. The contact points are of aluminum and require very little attention.

The splash system is used for the lubrication of all motors, the oil being carried in the lower part of the crankcase, which has

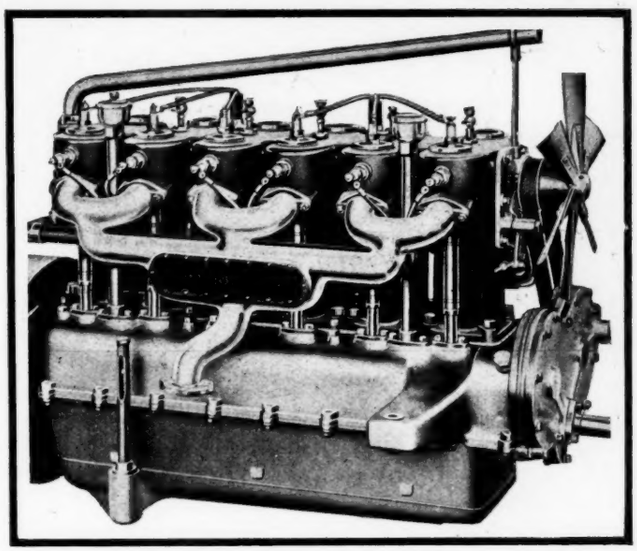


Fig. 3—Motor of 6-50 model with intake manifold and oil level

a capacity of about 2 gallons, and which is divided into four or six troughs, depending upon the number of cylinders of the motor. These divisions consist of the horizontal partition which forms the bottom in the lower half of the crankcase, together with the vertical partitions designed to keep the oil from running to one end of the crankcase when the car is on a grade. The partitions insure ample lubrication under all conditions, provided, of course, that the proper oil level is maintained in the crankcase. The splash system is of the constant level type and is readily adjustable by levels inserted in the side of the crankcase. These levels are shown in the illustrations of the 4-30 and 6-50 motors, Figs. 2 and 3, respectively. They have a micrometer adjustment and the level can be raised or lowered, according to the lubrication requirements of the motor. The oil is supplied to the crankcase reservoir through a filler tube mounted on the side of the crankcase, that on the 6-60 being shown in Fig. 5. This tube is equipped with a cap and filtering screen to prevent foreign matter from getting into the crankcase.

A gear-driven oil pump delivers the oil from the base reservoir

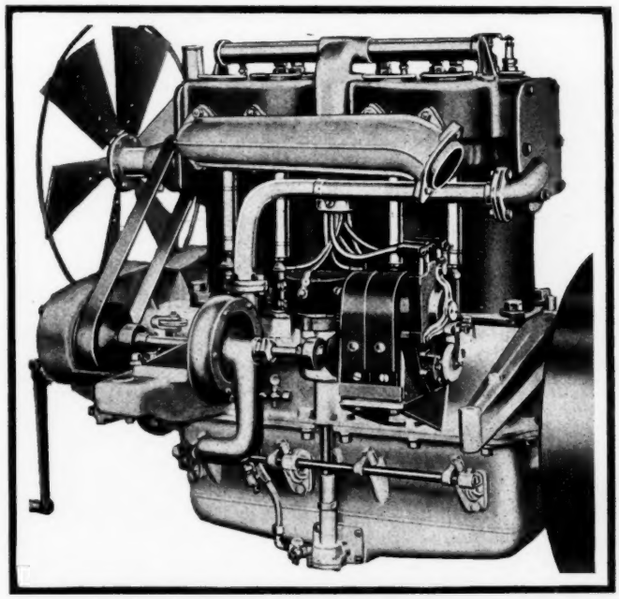


Fig. 4—Exhaust side of 4-40, showing fan, pump and magneto mounting

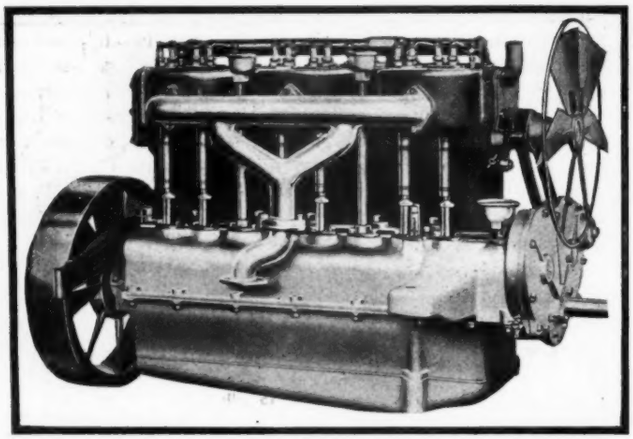


Fig. 5—Bringing out clean design of intake side of the Kline 6-60 motor

to a sight-feed on the dashboard. All the oil passing through the lubrication system of the motor must go through this sight-feed in full view of the driver, who is thus enabled to tell exactly the condition of the oiling system. From the sight-feed the oil is led to the crankcase where it enters the distributing pipe leading to the splash troughs in the upper part of the crankcase.

The steering gear, cardan joint and differential are packed in grease. The transmission gears run in heavy oil.

The carbureter used is of the automatic float-feed type and of special design to secure the greatest efficiency with the Kline type of motor.

Cooling of the motor is effected by means of a positive, gear-driven centrifugal pump forcing the water from the radiator up through the waterjackets and back to the radiator. The radiator is of foreign design, being of the flat tube, cellular type, of large capacity and substantial construction. The pump case is bolted to the crankcase, insuring permanent alignment. The auxiliary cooling system consists of a ball-bearing fan bolted to the forward end of the motor and driven from the pump shaft by means of a belt which may be readily adjusted to the proper tension.

The clutch is of the leather-faced inverted cone type with cork inserts, the leather used for the facing being of the non-burning variety. The clutch is provided with a ball thrust contained in the dustproof housing. A heavy spring released through the action of a yoke acting on a ball thrust ring holds the clutch in engagement. As soon as the clutch is disengaged, its rotation is stopped by a clutch brake. This tends to render gear-changing noiseless. The clutch pedal is compounded so that a slight pressure of the foot is sufficient to throw out.

A special feature of the Klinekar is the design of the double universal joint between the clutch and transmission, which instead of sliding to release the clutch, as in common practice, has an arm or spider mounted on the main shaft and connected in the clutch with blocks and pins. This promotes easy engagement. The joint is fitted with a metal greaseproof covering and is so constructed that it may be lifted out after removing the bolts which hold it in place, thereby giving free access to both clutch and transmission without further complication.

The Rushmore dynamo, driven by a silent chain from a gear on the main drive shaft just in front of the gearbox, as shown in Fig. 1, is mounted on an extension of the subframe supporting the gearbox.

The transmission is of the sliding gear selective type. It has four speeds forward and one reverse, with direct drive on third, being geared up on fourth speed. All speeds are obtained by single lever from the right side through an H-quadrant. The gears and shaft used are of heat-treated alloy steel. The bearings are imported and are of the annular ball variety. When changing gears, a sliding movement to either right or left engages one of the gear-shifting levers which operates the gear selected and automatically locks the rest. Gears are 6-pitch with .875-inch to 1.125-inch face, turned from solid bars of alloy steel and machined on the pitch line to within .003 inch, producing silence and ease of operation.

The driveshaft connecting the transmission with the rear axle is fitted with two universal joints, as shown in Fig. 1. These are automatically lubricated, the front one from the transmission and the rear one from the differential, and are protected from water, dust and dirt by steel covers. A slip joint is provided at the end of the shaft, being arranged so that it lies practically horizontal, thus preventing end thrust and wear on the joints.

The rear axle on all models is of the floating type, the bevel gears, differential and live axle being contained in a one-piece pressed steel housing except on the model 4-30, on which it is divided in the center. All moving parts of the differential and rear axle run on non-adjustable ball and roller bearings. The large differential and small bevel gears and bearings may be lifted directly out of the axle housing without disturbing any adjustments, except on the model 4-30, which requires only the separation of the two parts of the housing.

Two sets of brakes, both of the expanding type, are operated on drums on the rear axle by means of cams. Each set works through an equalizer and both are inclosed so as to be dustproof, except the 4-30 model, on which the service brakes are of the internal-expanding type, while the emergency brakes are external-contracting. This model has the expanding brake entirely inclosed in the drum and the contracting brake inclosed on the inner side.

The adjustments for taking up wear in the brakes are on the outside of the brake drums. To tighten the brakes, the locking nut is released and the adjustment bolt is turned to the right. This bolt is integral with the cam operating the brake and by throwing the cam on an angle increases the opening between the brake bands and consequently increases the outer diameter of the band. On the 4-30 the adjustment is made by means of turnbuckles on the brake rods.

The front axle is an I-beam drop-forging, the spring seats being forged integral with the axle.

Control is by means of spark and throttle levers located on a sector on top of the steering wheel and an accelerator pedal on the front floorboard. The spark and throttle sector does not move with the steering wheel. The gas and spark are regulated through gears located at the bottom of the steering gear housing and connected to levers for operating the carbureter, dis-

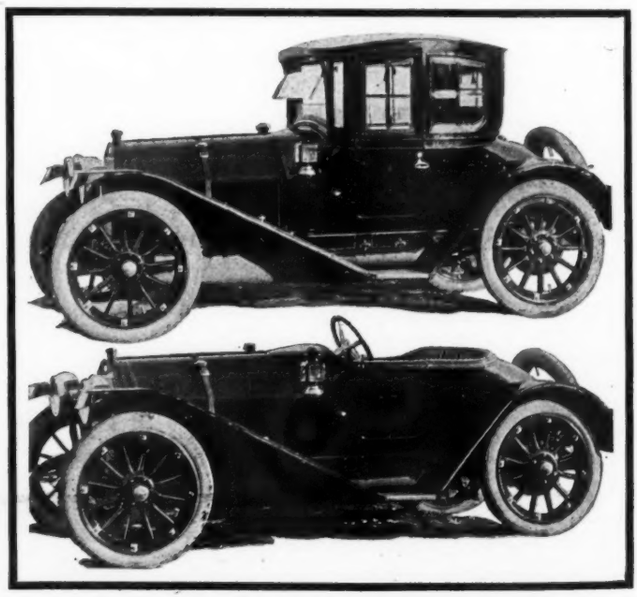


Fig. 6—Upper—Kline 6-60 coupé roadster with top
Fig. 7—Lower—Coupé torpedo roadster without top

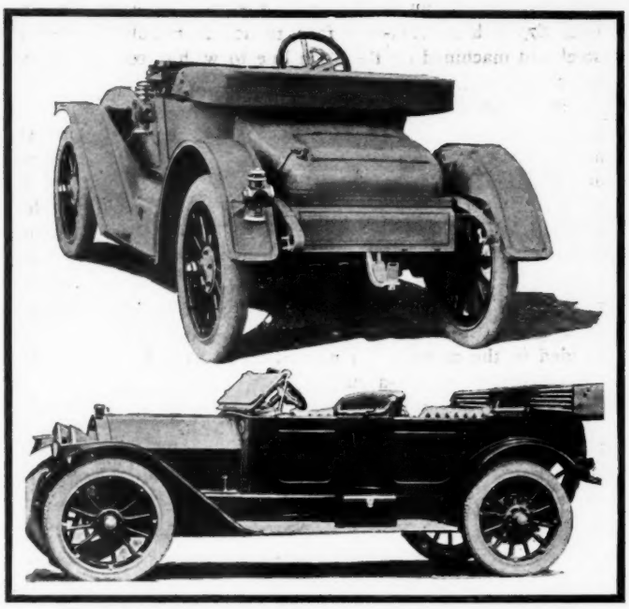


Fig. 8—Kline 6-50 runabout with baggage compartment
Fig. 9—Kline 6-60 model with foredoor touring body

tributer and magneto. The steering column is mounted on the right frame member and is supported by bearings in the dashboard. The walnut steering wheel is 18 inches in diameter. Steering is effected by a semi-irreversible worm and gear fitted with ball bearings to take up lost motion.

The frame is of heat-treated pressed steel, channel section with a subframe to carry the transmission, and, on the 4-30, another subframe to carry the motor. The main frame is narrowed in front to provide for turning the car in a small radius and has a kick-up over the rear axle to allow for spring clearance and to keep the center of gravity as low as possible, thus increasing the safety factor. Clearance on all models is 11 inches, except on the 6-50 and 4-30, on which it is 10 inches.

The spring suspension of the 1913 Kline has a novel feature in the shape of an auxiliary rear spring, which is shown in Fig. 10. This consists of a short, heavy spring which does not come into service except under an extra-heavy load or extremely severe road shock. Then it tends to resist the flexure of the main spring and thus reduces the jar on entire car.

Front springs on all models are semi-elliptic in form, the three-quarters scroll elliptic type being used on the rear, the only exception to this being the 6-60 and 6-50 Meteor special speed car, on which semi-elliptic springs are used all around. The front springs on all models are 36.5 inches, while the rear springs are 47 inches, except in the case of the Meteor, which has 50-inch rear springs.

The wheelbase of the 6-60 has been increased 2 inches over 1912. Wheelbases of the various models are as follows:

6-60	132
6-50	126
Meteor	110
4-40	118
4-30	115

Wheels on all models are of the wood artillery type, selected second grove hickory being used.

The tire dimensions on the various models for 1913 are as follows:

Model	Front	Rear
6-60	37 x 5	37 x 5
6-50	36 x 4.5	36 x 4.5
4-40	36 x 4	36 x 4
4-30	34 x 4	34 x 4

The Meteor is equipped with 36 by 4.5 tires all around for the 6-60 chassis and with 36 by 4 for the 6-50. Tread is the standard 56 inches with an option of 60 inches for Southern trade.

Combination steel and wood bodies of flush-side design are used in the 1913 cars instead of semi-aluminum. The 6-60 is furnished in touring car, toy tonneau, runabout and coupé roadster style, the passenger capacity ranging from two to seven, and the road speed from 55 to 65 miles an hour. The 6-50 also comes in these styles, as does the 4-40. The 4-30 is furnished as a touring car, toy tonneau and roadster only, the passenger capacity ranging from two to five and the speed from 50 to 60 miles per hour. Limousines, berlines and other closed and special body constructions are built to order. The Meteor is a special two-passenger creation mounted on the 6-60, 6-50 or 4-40 chassis, capable of 65 to 70 miles per hour.

Gravity fuel feed is used on all models, the capacity being as follows:

Model	Touring	Toy Tonneau	Roadster
6-60	19 gallons	17 gallons	26 gallons
6-50	19 gallons	17 gallons	26 gallons
Meteor			26 gallons
4-40	18 gallons	17 gallons	26 gallons
4-30	16 gallons	15 gallons	26 gallons
Coupé			32 gallons

An addition to the 1913 line of the Kline company is the coupé roadster illustrated in Figs. 6 and 7. Fig. 6 shows the canopy top in position, making the car a coupé, while Fig. 7 shows the top removed, leaving a comfortable, commodious roadster of the torpedo type. The mechanical specifications of this car are the same as the other 4-40, 6-50 or 6-60 models, as this is simply a special body mounted on the regular chassis. The detachable coupé top is mounted on the parapet of the roadster so cleverly that the joint is invisible, giving it the appearance of a one-piece body. The top has two large doors, one on each side, and the windows are made in either plain or Colonial style, the latter being shown in Fig. 6. The front glass is adjustable and the windows may be lowered to any height desired. With the top mounted, two large doors are used, for which smaller doors are substituted when the car is used as a roadster. The operation of detaching the top requires only 10 minutes, it being held by seven bolts. The interior of the coupé affords the same degree of luxury in appointment as a limousine and is fully equipped. When the top is detached and the small doors are bolted in place, the car presents an entirely different appearance, as shown in Fig. 7.

The equipment on all cars except the 4-30 includes: Semi-duquesne silk mohair top, side curtains and dusthood; adjustable clear vision shield; improved tire irons; Firestone universal detachable demountable rims; Rushmore dynamo, silent chain drive, with two electric headlights, 25 candlepower each, also sidelights, tail light and gauge lamp on the dash; automatic mechanical Ever-Ready self-starter; speedometer, horn, foot rail, coat rail, tire repair kit, pump, jack and complete set of tools. Black and nickel finish is employed throughout.

The equipment of the 4-30 is the same except that the self-starter is optional, the Ever-Ready mechanical type or the Prest-o-Lite acetylene starter being furnished as desired, there being a difference in price depending on the starter selected.

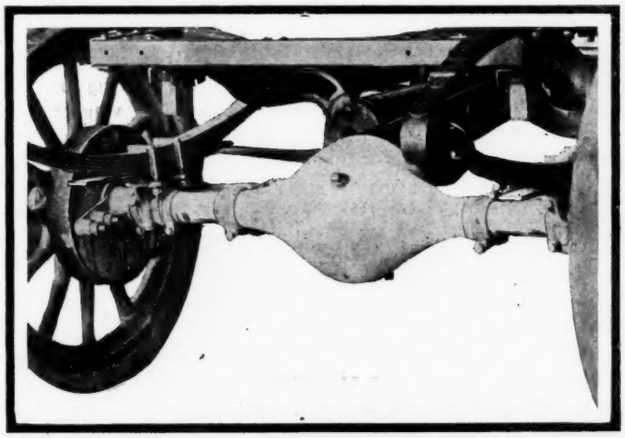


Fig. 10—Rear construction of the 1913 Klinekar, showing spring suspension and the auxiliary spring underneath the main spring

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A $1,000 British Car

"THE motor trade in this country has taken many years to come to the front, although today the best British cars are the best cars in the market. To turn to the manufacture of rubbish, from which no lasting reputation can be built up, is to cast away the fruits of long endeavor. We hope and believe that British manufacturers will have the good sense to stick to a class of work in which they, at the present time, excel."

This sums up the opinion of engineering England on the present agitation of bringing out a $1,000 British car to compete in the British Empire with the low-priced American machines. This extract from an editorial in the current issue of **Internal Combustion Engineering** is emphatic, it is certain, there is not any ambiguity in it, and it is straight from the shoulder. While coming from the highest motor car engineering authority in Great Britain it expresses a sane survey of the situation from the engineer's viewpoint, penned as it was by one who has traveled through America, knows the enormous buying possibilities of this country and is also entirely familiar with the manufacturing methods necessary for the production of such a car.

Speaking further on the subject editorially:

"Any creator of cheap-car schemes must steadfastly keep before him the immensely important fact that the American maker has 100,000,000 of people at home and many more millions just over his frontiers. Here in the British Isles not only is there a much smaller population, but a smaller percentage of the population are possible, or probable, buyers of cars, because greater distances, lesser value of space and a higher average earning ability prevail in the United States. And above all the American car in America only costs half or less than half its European price, if price be reckoned as a percentage of earnings. One thousand dollars is approximately equal to £200 on rates of exchange, but $1,000 is as easy to earn in America as £100 in England, and it is earned. This means that the American market is not only twice the size of ours—in proportion with the population—but four times as great. We lay special emphasis on this aspect of the matter as it is seldom realized. **What it means, is that to have as good a business proposition in proportion to the population here as the $1,000 car in America, the identical vehicle would have to be sold at from $400 to $500, obviously utterly impossible."**

This is sound reasoning, which could be carried further, namely that a British factory would have to entirely re-vamp its method of manufacture before production of a cheap car would be possible in the face of the prices of American cars in Europe. The British factory is not equipped with the intricate jig systems of America; a year ago in plants turning out over 2,000 cars a year it was difficult to find half a dozen jigs in the entire factory. Hand labor was relied upon everywhere. Parts were removed to be fitted and refitted again and again before they were finally assembled. Such practices could not exist with the $1,000 car. To bring out a cheap car would alone be a big problem, but this task would assume enormous proportions when it coupled with it an entire revision of manufacturing methods.

In commenting on the possibilities of a cheap British car outselling a cheap American car in the British colonial possessions, such as Canada, Australia, South Africa and parts of South America, the editorial goes on to say: "It is easy, too, to talk glibly of the colonial markets, but there it is not so easy to sell British cars, except those of the highest reputation. Our citizens overseas know the cheap American car, and the good British, but the cheap British machine is unknown and would therefore be regarded with suspicion. It must also not be forgotten that an American maker has always this free-trade island—the British Isles—as a dumping ground, so that a slight overestimation of output can be corrected easily. We here have no similar land to take our own surplus with open arms."

This aspect of the colonial trade is a true one, but goes further in that the British subject in Canada realizes the value of close proximity to the American factory for spare parts, so that in case of breakage there is not an expensive cable toll and a 6-day boat trip, meaning a delay of perhaps 10 days, but the possibility of having the spare part reach him within 1 or 2 days at the utmost. This is strong argument for the United States car in America and chiefly for the Canadian market.

Gathering of the first General Automobile Sales Association in the auditorium of the Claypool Hotel, Indianapolis, Ind.

General Automobile Sales Association Is Formed as Result of Indianapolis Convention

New Organization Aims to Bring Together the Automobile Manufacturer, Dealer and Advertising Man—Keynote in Resolution Perpetuating the Association Which States That Helping the Dealer Benefits the Whole Industry

INDIANAPOLIS, IND., Oct. 9—The General Automobile Sales Association, which claims Indianapolis as its birthplace, brought its first convention to a close this afternoon after having staged a remarkably successful 2-day meeting of dealers, manufacturers and advertising representatives. In the automobile industry, the newly-born association is unique in its scope and purposes, for it brings together the dealer who sells the cars, the manufacturer who makes them and the advertising agent who creates the demand for them. All must work in perfect harmony for best results, and it is for a better understanding of one another that such a gathering was proposed.

Homer McKee, of the Cole company, is the originator of the idea, although J. J. Cole made the first meeting possible by lending what financial assistance was necessary. And to Francis L. Wurzburg, general manager of the Class Journal Company, belongs the credit for its perpetuation. His resolution, proposed and adopted along towards the end of today's session, strikes the keynote when it states that "in helping the dealer, the whole industry is benefited." Incorporated in the resolution is a list of fourteen representative figures in the industry who have been selected to put the organization on a firm and lasting foundation, and whose very participation in its future affairs assure it of a healthy and rapid growth. The resolution follows:

"Whereas, we, the charter members of this, the first automobile retail convention, are of the opinion that an organized national movement in behalf of the retail dealers will be of great benefit to the industry, be it

"Resolved, that we hereby constitute ourselves the nucleus of such an organization and pledge ourselves to its perpetuation.

"And be it resolved that the next meeting be held in Detroit in 1913 at a date to be later determined.

"And be it resolved that the following men be appointed as a committee in charge to serve for one year:

"J. J. Cole, Indianapolis; Homer McKee, Indianapolis; H. M. Swetland, New York; E. LeRoy Pelletier, Detroit; John C. Wetmore, New York; Hugh Chalmers, Detroit; Roy D. Chapin, Detroit; William Boyd, Chicago; Carl Page, New York; C. B. Mears, Cleveland; J. L. Mahin, Chicago; H. L. Stratton, New York; J. G. Monahan, Indianapolis; F. B. Stearns, Cleveland."

Unlike many a great undertaking which has had humble beginnings, the General Automobile Sales Association, which was so named on the suggestion of J. J. Cole, received anything but a small start. Long ago manufacturers in other branches of industry realized the advantages to be gained from helping the dealer in just this

Heard at the First General Automobile Sales Association Convention at Indianapolis

"The idea of helping the dealer in all his problems is worthy of all the effort we can muster."—J. J. Cole, president Cole Motor Car Company.

"A good dealer can hold up a poor car a good while, but a poor dealer cannot uphold a good car very long."—H. O. Smith, president Premier Motor Manufacturing Company.

"If we can ever get a co-ordination between advertising and sales, there is nothing we cannot do."—E. LeRoy Pelletier, Flanders Interests.

"The automobile industry is one of the great, strong, red-blooded businesses of to-day."—C. A. Bookwalter, president Cheltenham-Ætna Press.

"Individuality means everything in business."—W. D. Nesbit, Mahin Advertising Company.

"When you sell a man an automobile, you do him a great benefit."—Elbert Hubbard.

"By service is meant the education as to the proper use of an article, its speedy adjustment and quick parts replacement."—H. G. DuPree, Remy Electric Company.

"Advertising, instead of detracting from a salesman, multiplies his services many times."—W. H. Boyd, Curtis Publishing Company.

"There will be no more automobile departments in the daily newspapers when races, reliability runs, endurance contests and other motor car competitions cease to be carried on. Manufacturers should support them."—J. C. Wetmore, New York Evening Mail.

way, and it marks the beginning of additional prosperity for the great automobile industry of this country and Canada when such a method of promoting the sale of motor cars is adopted. Not only has the industry welcomed the idea openly and eagerly, but without exception every figure of note in this great business who attended the 2-day meeting was enthusiastically in favor of it and congratulated the Indianapolis men for conceiving it.

Some of the more striking high-lights that developed during the sessions in the delivery of the addresses were the following:

J. G. Jones, of the Alexander Hamilton Institute, New York City, in speaking on Headwork in Salesmanship gave some sound advice to dealers and salesmen: "Since automobile manufacturers are building cars along scientific lines," he said, "the salesmen should sell them along the same lines. There are fourteen qualifications for a good salesman. They are: Natural qualifications, prime condition, personality, ambition, honesty, courage, acquired qualifications, confidence, enthusiasm, earnestness, application, preparedness, observation, self-analysis."

"How to Use Advertising in the Retail Game," by J. L. Mahin, of the Mahin Advertising Company, Chicago, was one of the best addresses of the convention. Mr. Mahin pointed out the many phases and kinks for the edification of the dealer and laid special emphasis on the fact that service for the customer is the major point for the salesman to keep in mind. Mr. Mahin's address is on pages 794 and 795.

S. A. Seiberling, president of the Goodyear Tire & Rubber Company, Akron, O., delivered a masterly talk on the future of the industry. "The automobile industry has written one of the most spectacular pages in the history of the world," he said. For the coming year he predicted the following:

"At this rate 10 years from now the automobile business and its allied interests will have a value more than four times greater than that of the great Pennsylvania Railroad system. And when we shall have developed and taken advantage of our roads and highways by using automobiles on them, the automobile industry will be worth more than the entire railroad interests of the country. The dealer is the medium for this great growth.

"But," continued Mr. Seiberling, "the dealer of the past had an entirely different problem from that with which the dealer of the future will have to cope. Cars must henceforth be *sold*, whereas in the past they have been *bought*. Service in the future must begin when the car is sold. The dealers in each community have problems which are local to that territory, and these must be evolved by co-operation."

H. L. Liebricht, of the Export Advertising Company, said of the possibilities of extending foreign motor car trade. "In foreign countries all realize that the medium-priced American car has no equal. But the greatest drawback to the sale of American cars abroad is this question of service. The European manufacturer sells more cars in South America than does the maker from this country simply because the buyers can get their cars repaired reasonably and quickly. There are many openings for American garages where American cars are understood. Ninety-five per cent. of the chauffeurs abroad are Italian, Swiss or German, and these men do not understand the American car. They cannot repair it. Consequently, there is much demand for the American chauffeur. There is an opportunity for many a young American in this business, therefore, in foreign lands. In all foreign countries new roads are being built, which broadens the field for cars. Last year Venezuela appropriated $285,000 for good roads, and she will set aside $400,000 for the same purpose for the coming year. The foreign field is unlimited."

"Advertising instead of detracting in any way from the salesman aims at multiplying his services many times over," was the keynote of W. H. Boyd's message to the convention. Mr. Boyd, continuing, said: "The whole type and standard of salesmanship is improving. Today a man can be a good man and still sell goods. The forces and influences which are put into the salesman's hands are a far greater asset today than any personal qualifications which he may possess. Here is where the sound manufacturing organization and advertising come in."

Mr. Boyd also touched upon the actual and potential demand for advertising. "Your advertising must not only convince the man who buys a car, but it must make converts to your line of all those with whom he comes in contact before the sale is made. Many of these may never buy a car, but they have an influence upon the man who does. If public sentiment is in favor of a particular car, it will sell, for one is proud to own something which others admire."

The inadequate advertising fund was decried by Mr. Boyd, who added "that to make a car known it must be hammered into the people incessantly. One big advertisement in a national publication followed by none at all is of little value. The article must be kept constantly before the public. Before signing up

Co-ordination of Sales and Advertising

Extracts from an address by E. Le Roy Pelletier before the First General Automobile Sales Association in Convention at Indianapolis, Ind., October 8 and 9

TO knock your competitor will never get you anywhere. Personally. I most admire the man who gives me the strongest competition. We are all in business for the same purpose, and every man is entitled to a share of it in proportion to his ability. If we were asked to pick out the best car made today, we could not do it, for they are all good, and to run down the products of other makers to a prospect is to jar his confidence in the product as a whole.

When the time comes when we get a perfect co-ordination between the advertising and sales ends of the industry, there is nothing which the industry cannot do. Just because a man was not in the market for a car 2 months ago is no reason why it is useless for the agent to call upon him today. Prospects are born in a night. When the automobile dealer is enjoying himself in the evening, his advertising is still working for him, hammering home the need of every man for a car. And seated at the library table, the man who is thinking of a car reads the advertisement and becomes convinced and enthused.

There is not a very large percentage of good salesmanship in the automobile business. Motor car salesmen would do well to emulate the cash register and adding machine salesmen, for these men can bring back only one of two things—the order or the burial certificate of the prospective purchaser.

This convention is an excellent idea, and being such it cannot fail. I predict a much greater attendance of dealers and manufacturers another year. But the main lesson for every dealer to gain from the present session is to go back home and organize another little convention of the dealers in his community, and to talk over with them the subjects which have been discussed here.

Price cutting should cease. The whole world is a disorganized organization working against the little community of automobile dealers, and the latter are very foolish to cut one another's throats, making their ranks just that much smaller to cope with the greater outside army.

How to Secure the Newspapers' Aid

Excerpts from an address by John C. Wetmore before the First General Automobile Sales Association

THE dealer is the man behind the gun. The whole success of the industry depends upon the gunner. He sells 80 per cent of the cars made—the small dealer, not the branch manager.

I am proud of what the newspapers of this country have done for the automobile. The automobile was bound to arrive at its present state of perfection sooner or later, but through the aid of the press it has arrived 5 years ahead of time. The dealer should follow several tips as to how to get the best results from his newspapers in his home city.

In putting publicity in the newspapers, the dealers should use the right kind of stuff—that which has a news value. Boost the man who boosts you; put your advertising in the paper which supports automobiles for this is the paper which is read by the class of people whom you wish to reach. Create a field of optimism and don't knock. Create a desire in the minds of the buying public to own motor cars—don't point out all the faults of the machine.

The automobile departments of the newspapers must have something to talk about—they must have real news—else they cannot survive. When there are no more races, motor car contests and hill-climbs, then there will be no more newspaper support. It is up to the makers to enter these things to furnish news for the press and to keep automobile news alive.

with any car maker the dealer should assure himself of the maker's consistent and national advertising campaign. For this reason every dealer should become a student of advertising."

"There are two distinct types of salesmen whom we come in contact with every day," continued Mr. Boyd. "One is the personal salesman, the man who has brilliant qualities as a salesman, who has his own methods and has perfect confidence in himself; and that is a good type. But there is another type that I would call the scientific salesman, were it not for the fact that that word scientific has been used so much that it is becoming stale and has lost to a large extent its original force. But I would call the salesman I have in mind the 'social'—not the 'sociable.' That is the salesman who represents the organization with the buyer; the man who does not depend upon his own brilliant qualities of personal salesmanship, but the man who depends upon the force and influences which have been created for him to use, who knows how to shape this force and influence for his own individual purposes.

"The forces and influences that are put in our hands as salesmen are far greater and far more effective than any personal qualities which we will be able to exercise, no matter how brilliant we may be.

"That naturally brings me to the subject of advertising and what it represents, and especially what it represents to you salesmen who have back of you a manufacturer who appreciates to the full extent the value of advertising and knows how to use it in such a way as to put the greatest possible dynamic influence and power in your hands to use.

"I want to emphasize the essential difference between what is the natural and potential demand of advertising. When an advertisement or a series of advertisements appears in a magazine, immediately it arouses curiosity and interest on the part of people who are interested in the product, and it develops immediately a certain amount of tangible evidence of its presence. A few people, perhaps several thousand people, will send in a direct answer to that advertisement and ask for a catalog or information of some kind about the product. Many other people will go into the dealer's store in their respective communities and ask for the article advertised. I am speaking now, of course, of publicity advertising which is intended to stimulate the sale of merchandise through local dealers all over the country. But whatever may be the tangible evidence of that advertisement, or that advertising, it is only a very small fractional part of the real value of the advertisement and the potential value of the advertisement, which has been sown broadcast among the multitude of people who read the advertisement. Without any attempt at accuracy, if the tangible direct value of an advertisement is measured, we will say, by 10 per cent, the potential value of the advertisement must be equal to at least 90 per cent.

"What is this potential power of advertising with which we are concerned, and which is the most vital thing that will come before this convention?

"That advertising in order to realize its greatest value must touch and influence directly not only the people who are interested in the purchase of an article, but all the people who may influence those who actually do purchase the article.

"So it is up to you dealers to study the advertising just as carefully as you study the mechanism of a car, and be sure that you have got the kind of advertising that is going to educate every man, woman and child in your community as to the value of the car."

H. G. DuPree, of the Remy Electric Company, Anderson, Ind., spoke on the topic of service, asserting that the accessory maker must have service for his customers as well as the car maker. The automobile today is sold in competition with almost everything else, for people must give up other luxuries in order to afford the machine. Service for the customer is essential. It might be argued that service implies that something is going to happen to the product, but people who become so delighted with the results of quick repair and so on that they loose sight entirely of this thought. Courtesy, dispatch, kindly interest and diplomatic conversation are the chief essentials to successful service.

In introducing Elbert Hubbard to the convention Mr. Nesbit stated that individuality means everything in business. Hubbard is individual—he is eccentric and unique. Mr. Hubbard interspersed his humorous talk with words of motor car wisdom. When you sell a man an automobile you do him a favor, he said, for you give him a chance to get out into the great out-of-doors. He made a plea for good roads, and for Fisher's project of a transcontinental stone road, saying that every manufacturer should set aside 1 per cent. of his gross income each year for the proposed highway. Mr. Hubbard's address will appear in next week's issue of THE AUTOMOBILE.

The Scientific Selling of Motor Cars

Extracts from an address by C. F. Kettering before the First General Automobile Sales Association in Convention at Indianapolis, Ind., October 8 and 9

EVERY business is confronted with the selling problem and the automobile industry is not any exception. There is no other means of transportation today which can rival the motor car as a solver of the problem of the carrying of persons and things from one point to another. For this reason, the automobile has passed the experimental and the merely pleasure stage and is a permanent fixture. A good dealer can hold up a poor car a good while, but a poor dealer cannot uphold even a good car very long. To increase sales, educate the salesmen. There is no influence for their betterment which surpasses such a gathering as this. There are few things in the automobile business today which are worse than the practice of taking used cars in trade for new ones for more than such cars are worth. The used car should be taken in at a figure which will allow for its quick re-sale.

Does the dealer broaden the industry by trading in cars at such prohibitive figures that it is impossible for him to get rid of them again? The interests of the manufacturer and dealer are identical. The manufacturer is closely interested in the dealer, for the latter is a part of the selling organization. If the dealer is devoid of prosperity it reflects upon the car maker.

Starting as a luxury, the motor car today is a practical proposition. It is one of the keys to the high cost of living, for it makes it possible for the farmer to get to town with his wares oftener, for the city business man to live in the suburbs, and in the commercial field it is conducive to lower transportation cost. It is most important for the dealer to select the best selling line of commercial cars for his territory. That line which sells best in one community is not necessarily most popular in another. The dealer should have explicit confidence in the line which he sells, for he cannot enthuse his prospects unless he himself is enthusiastic. The first question which some realers ask is, "What is the discount?" A low cash selling basis and a long discount do not go together.

Development of the Automobile Industry

Excerpts from an address by H. O. Smith before the First General Automobile Sales Association

IN this day and time, automobiles have become so common that we of the superior knowledge of their workings have slipped somewhat away from the calling to the attention of those who do not know them so well what really wonderful pieces of mechanism they are. There are many thousands of people who still look upon them as experiments, and it is these whom we must interest.

The salesman who is alert will relate to the passive prospect the story of the development of a gear, a rubber tire, a carbureter or any other parts of the car in a way to incite his admiration for the supreme efforts which have been necessary to bring about such perfect-runnning machines. If he complains of the troubles which are experienced with tires, point out to him how bad it would be if there were no such things as pneumatics. We marvel at the great and powerful mechanism of the locomotive, yet we pass with a glance the automobile, which is a far greater thing. Do not say to the buyer of a car that he *must* oil this or that, but point out to him the disastrous results of not doing so. Such concrete examples as this will teach the man how to take care of his car, where mere directions as to what to do and what not to do would not be heeded. By getting him to appreciate the mechanical reasons for doing *this* and not doing *that* you stimulate his interest and make him a satisfied purchaser.

How To Use Advertising in the Retail Field

Substance of the Address Delivered by J. L. Mahin Before the First Annual Convention of the General Automobile Sales Association at Indianapolis —Service for the Customer a Big Advertising Factor

SERVICE—Sometimes we salesmen get a little bit confused in our viewpoint as to whom we are actually serving. **Do we actually serve the man who pays us the money, or the man who takes the product of our sales and consumes it?** The keynote of the talks yesterday all seemed to be along the line that the consumer, the man who took the automobile off the market, was really the man who was to be served.

There is no question that the manufacturer up to date has done his duty in that direction. Nobody could listen to what Mr. Kettering said yesterday about the wonderful scientific and mechanical problems that had been overcome in the production of a motor car, placed in the hands of people who do not have to spend a lifetime of study and experiment in getting satisfactory service, but appreciates that fact. **The successful manufacturer to-day is the man that is looking out to give service to the man who pays the money.**

I believe in salesmanship. To me salesmanship gives a man positively the best opportunity for expressing the force which God Almighty has put into him. Salesmanship is the ability to get other people to accept your viewpoint as to the value of the thing that you have to present to him. That is really all that salesmanship is. **It is the power and ability to get others to accept your estimate of the value of the thing that you are connected with or that you have anything to do with.**

On this question of salesmanship does the dealer render service? And if he renders service, to whom does the best part of his work go in the form of service? Up to date in many quarters there has been an impression that the dealer was working for the manufacturer; but the question, it seems to me, for you gentlemen to seriously consider is: **Can the dealer render 100 per cent. of efficiency in service to the automobile user? Can he? If he can, it does seem to me that the solution of the thirteen problems that were on the list that was sent to me, which will be brought out in this convention, will be comparatively easy.**

The manufacturer recognizes that the dealer who best serves the consumer is the best dealer for him. **The dealer who can serve the buyer, give the buyer the most intelligent and efficient use out of the car that he buys, is the best dealer for the manufacturer.** That being true, why is not that dealer the best dealer for the dealer himself? And is it possible for the dealer to earn every cent of the money that he gets on a car in actual service to the buyer? I believe that it is; and I believe it so strongly that I have an order in on a car absolutely on that basis to-day. I believe that the dealer who makes his legitimate commission off from the sale of my car is going to earn his money. I propose as a committee of one to see that he does anyhow, and I believe that he is going to do it. I believe that that car is going to be worth more to me than it possibly could have been if I had gotten the agent's discount and not have the service that I intend to have and have already received through that dealer.

Now what can the dealer do for the consumer? Certainly in as complicated a piece of mechanism as a motor car, notwithstanding the wonderful foolproof qualities that brains and skill and experimentation on the part of the manufacturer have put into it, certainly in a motor car as complicated as it is the buyer cannot learn too much about it; he cannot know too much about it to get full efficiency out of it.

The manufacturer cannot meet the buyer face to face. He cannot size the buyer up as a man and see what he reveals in his countenance or in his manner, as to his special fitness to handle a motor car, or his viewpoint toward things in general. **The manufacturer cannot get that delicate point of contact. The dealer is the only one who can get that contact, and when a car is properly and intelligently used it saves trouble with the car.** Who is to put the owner of the car in the mental attitude by which he can save that trouble except the dealer? And how can the dealer do that unless he not only knows the car, its powers and its limitations, but also he knows human nature, and knows what the man who buys that car is likely to do to it or not do to it, and keeps him in the proper mental frame of mind toward the car, its functions, its care and attention? Isn't it reasonable to assume that if the dealer takes the attitude with a man, after he has sold him a car, as was stated here yesterday,—that you are going to have tire trouble, but you would have nothing but trouble if you did not have tires; tires overcome trouble; without them there would be no motor car—and if you educate the buyer to the old fundamental principle of life that prevails everywhere, namely, that anything which is worth having is worth working for; that you cannot get full, efficient, satisfactory service out of the car unless you properly use it, unless you give thought and work to the use of it; get the buyer in full appreciation of the responsibility that he possesses as one in possession of the car—I say, isn't it reasonable to assume that if the dealer puts the buyer in possession of these ideas and into this attitude, isn't the life of the car going to be longer? Won't it give greater satisfaction, greater mileage? Isn't it going to be possible to take care of the car so that it will be worth more than it would be if it were indifferently or carelessly handled?

If that is true, there is the dealer's opportunity and the dealer's responsibility.

Now, I have said a good many times before that salesmanship has two primary qualities. No successful salesman that I know but what has the ability to be both plausible and sincere. What is plausibility but the ability to size up the man you want to sell something to, and present what you have to him so that it appeals to his viewpoint, his standpoint? To do this you have to know human nature. You must know the circumstances of the buyer. You have got to look at the thing from his viewpoint before you can be plausible. If you are plausible, if you fit what you have into the scheme of life and the every-day experiences of the buyer you have got him coming your way; he is yours; he belongs to you. You have given him the best demonstration of the power of salesmanship. **Plausibility is adapting what you have to the viewpoint of the other man.**

Service is really all you get out of an automobile. You can have all sorts of equipment on your automobile, but when you want it, and it isn't fit to run, what good does it do you? It is like money in the bank which the banker will loan you **when you don't need it.** The time you want it is when you need it, and really that is all that any buyer gets out of an automobile, service when he needs it. And isn't it possible for the dealer to take the same viewpoint toward his function in the sale, service to automobile buyers so that he can honestly and conscientiously feel that so far as the automobile buyer is concerned the money that he, the dealer, gets is the best invested portion of the whole transaction? If that is true, gentlemen, if that can be made true—and I honestly believe it can be made true because that is a fundamental principle that is borne out by every successful salesman that I ever met—it is worthy of your serious consideration. I never met a successful salesman yet, a really successful salesman, a man who could sell anything and knew he could do it, but who could add the cost of his salesmanship to the cost of the article that he was selling and make that thing that much more valuable by that amount.

If that can be done in the automobile business by the dealer getting that idea in his mind, that the services he renders the buyer, the man who buys the automobile, that is the best portion of the service that these buyers can get and a lot of these other problems will adjust themselves.

The first problem; how to dig up new prospects: **The best way to dig up prospects is to have a satisfied customer boosting for you. There is nothing that beats it. The voluntary service of a satisfied buyer will bring you more of the**

best kind of prospects than anything else that I know. The best manufacturers to-day are using the best advertising mediums, the best advertising ability, the best engineering ability, and all of that service is being given to the dealer. All the dealer has to do is to simply discriminate and use ordinary, every-day common sense and judgment in tying up with the manufacturer that gives him all of the other facilities for service which the dealer himself is not in a position to render. That is only a matter of decision and choice on the part of the dealer.

The manufacturer wants the good dealer a whole lot more than the good dealer wants a good manufacturer, as a rule—in other words, I firmly believe that there are more good manufacturers than dealers available; so it is up to the dealer to simply exercise his choice, you see, as to the concern that he is going to tie up with, and the fellow that has not mastered engineering service and advertising problems needs that service more.

How to deal with women: A woman does not want to ride in a car that does not look like something and that does not give service. She wants a serviceable, presentable car. A car where your customers are your boosters, where your customers are saying good words for you, you get the best class of people as your clientele, it does seem to me that right on that point alone there is a strong force at work.

Now to organize and maintain a money-making sales organization. **The best money-making sales organization is the sales organization where the salesman earns all he gets in service to the buyer. All the rest of it is then just velvet; what he does for you or sells for you is velvet. But he will never get that thought in his mind unless you put it there; talk to him about it.**

How to prevent frittering away profits on free repairs: The better way indeed to prevent frittering away of profits on free repairs after you have sold the car is to have demonstrated to the buyer and have him accept his responsibility in the care of that car. What better way is there? After you have shown him what he has to do to get full service a good start is made. Don't show him in a negative way. Don't say, "Don't do this, that or the other thing," but say to him, "You must put this oil in here, and do this and do the other to get the highest possible service," and you get him to do that, and then if he comes in and wants you to make repairs you ask him, "How did that happen? Didn't you do so and so?" "Yes, I did that." "Well, don't you remember I told you about that very thing?" Now, isn"t that man in a better position and more likely to be fair with you and not to demand unreasonable things than he would be if you had never told him those things? Isn't he in a better position to not demand unreasonable things from you?

How to dispose of second-hand cars: If the dealer believes himself that the price he gets on the sale of a new car he earns in service to the buyer he is not going to give up part of that in taking a loss on a second-hand car. He cannot consistently be honest with himself and take a loss on a second-hand car when he has given full value to the man who bought the car in the first place, can he? I see one of you men shaking your head. That doesn't scare me at all. I have heads shaken at me so many times that I don't mind it. We have got to aim high. We have got to have an ideal to strive for and we have got to have a margin of safety—all of those things. But I will come right back again: If you can get yourself, Mr. Dealer, to believe that you earn in service to the man who buys your car all of the money you make out of the car, if you really believe it, you are not going to be so keen to take his second-hand car at a price that will lose you money, and it will help a long ways to get yourself into the proper mental attitude.

You can never ask anybody or expect anybody to believe what you don't believe and get away with it for any length of time, I don't care how plausible you are. The salesman who lasts is the man who is sincere. The man who is not afraid of the lost sale on the wrong basis will eventually win and you cannot do something in this world and get a reputation for doing something without it costs you something; and one of the things it will cost you will be a lost sale now and then to a man who wants the unreasonable thing and who puts you in the attitude of not being consistent if you do the unreasonable thing that he has wanted you to do. You have got to take the stand, but you will win in the long run.

There isn't any better philosophy than Mr. Hubbard preached last night—that you win in this world by indirection. You don't always win the thing that you set your heart on, but the fundamental principle that you put into your work, that you stick to, attracts to you somebody else to take the place of the lost one.

I could go on with all these thirteen arguments, but I have very much exceeded my time. However, I will just say a word about the sincerity that is back of salesmanship—the ability to take the loss of a sale and to smile and go back again.

I am a believer in the salesmanship that is expressed in the philosophy, **that the man who gets the most turndowns makes the most sales because he makes the greatest number of calls.** That has been my experience in salesmanship. I have not found any easy, royal road to success. I don't know any way to catch many fish by sitting down and waiting for the fish to come. The best method of fishing to-day is going along the stream and casting the fly in everywhere and the fellow who does that all day brings home more fish than the one who sits down and waits for the time to be ripe or the sun to be just right and the wind in the right direction and waits for the fish to come to him.

The business of selling automobiles is working upon so many complex things in human nature, the emotions, the sentiments, the sympathies of life—they are all somehow entwined in the automobile. The man who rides in the automobile for purely sentimental reasons, to give himself relaxation, to give his family greater enjoyment, is contributing to a cause in the matter of good roads that will unquestionably be one of the greatest economic developments and forces for good that this country could possibly accomplish. And a business that gives a man an opportunity to do all those things is a mighty good business to be in and it seems to me it is a business that a man ought to be proud to be in. An automobile dealer has the opportunity; he comes in contact with human nature in all of its phases. He is dealing with the manufacturer. He comes in contact with the biggest brains and the most courageous dispositions that it is possible to find in this country. He meets the men who do things in a big way. And in meeting his customers, the car buyers, he meets every kind of human being and the man who can sell motor cars—and the time is coming if it is not here when motor cars **must be sold** rather than simply **supplied**—is the man who certainly is to be envied for his position in the world.

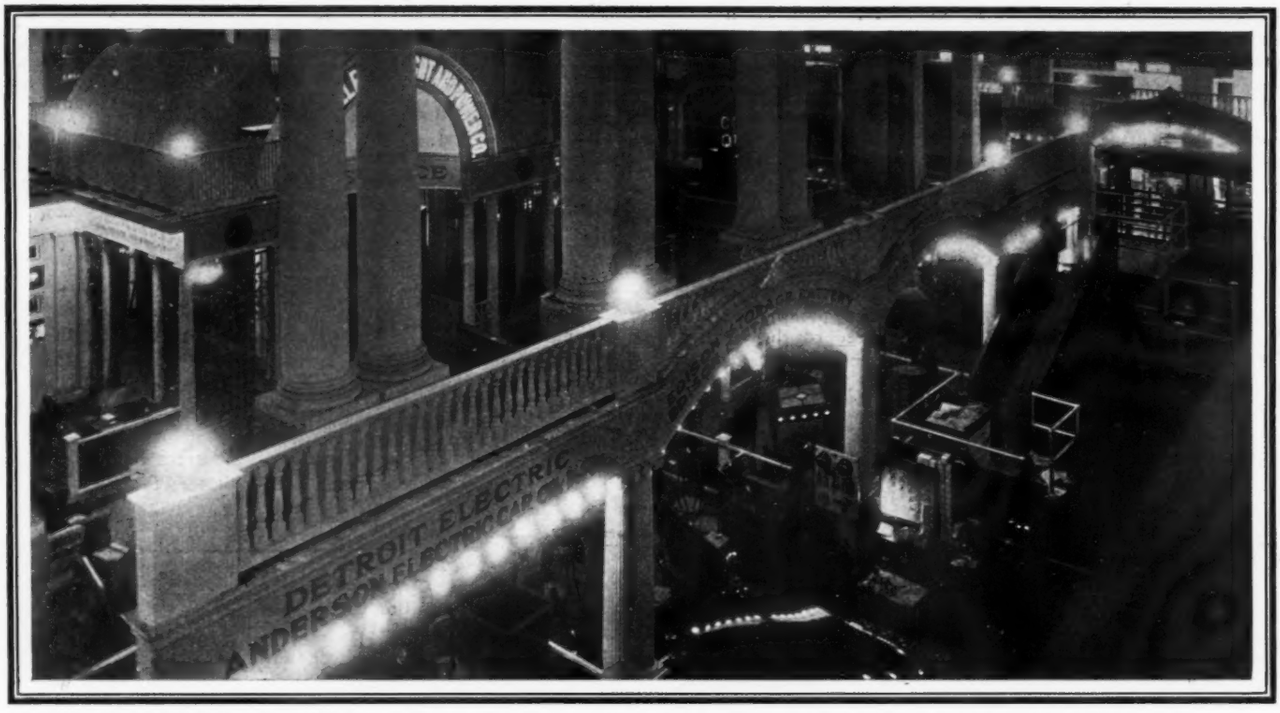
Now, it is possible for every man in every community to have leadership of some kind, and leadership as an automobile dealer, it seems to me, is a very enviable thing from the standpoint of a man's own self-respect. He has got to do more things well to be a successful automobile dealer than almost anything else I know. And in doing more things, and doing them all well, what is he doing to himself? Isn't he being true to the purpose that God Almighty put us into this world for, and that is, finding out all the hidden forces and resources we have within ourselves and using them with a beneficial purpose for those with whom we come in contact?

Automobile Men Enter Insurance Field

In an effort to bring order out of the present chaos pertaining to automobile insurance and to inject an element of competition that will work for more reasonable rates, the National Motor Indemnity Company and the National Motor Insurance Company have been chartered at Albany. The former concern will insure against automobile collisions, property damage and liability and the latter will cover fire, explosion and marine hazards. The managements will be identical and the policies issued will be contained in one document if convenient and losses will be handled through one adjustment department.

A number of prominent men in the automobile industry are named as among the incorporators of the companies, among whom are the following: William E. Metzger, A. G. Batchelder, Hugh Chalmers, Thomas Henderson, Albert C. Pope, Alfred Reeves, S. A. Miles, Winfred J. Foss, Edwin B. Jackson, A. E. Maltbie, George W. Hipple and Chester I. Campbell. William B. Joyce, president of the National Surety Company, will be chairman of the executive committee of the new insurance organization.

The companies will be affiliated with the Motor Union Insurance Company, of Great Britain, which has an intimate connection with the Motor Union, the big organization of automobile owners of Britain that corresponds with the American Automobile Association in the United States.



Interior view of Electrical Exposition, held now at New York Grand Central Palace, where eighteen models of electric automobiles are exhibited

Electric Car Men in Third Convention

More Than 150 Members of Electric Vehicle Association of America Meet in Boston —Capitalization of $500,000,000 in the Automobile World Represented— Standard Charging Plug and Lamp Socket Adopted

BOSTON, Oct. 12—The feature of the week was the big convention of the Electric Vehicle Association of America, which was held here the past few days, the association representing a capitalization of $500,000,000 in the automobile world. It was the third convention of the association and there were present more than 150 members. President William H. Blood, Jr., of Chicago, called the convention to order Tuesday morning, saying among other things:

"A few years ago electric vehicles were not largely used and the public was unaquainted with their true value. The vehicle manufacturers were not making large sales and their factory and selling costs were necessarily high. As few electric vehicles were being marketed the makers of batteries were making correspondingly few batteries. Central stations with comparatively high rates for current were hindering rather than helping the introduction of electric vehicles. All of these interests awoke at about the same time, joined hands and formed this association with the result that the use of the electric vehicle has increased marvelously and its adoption is becoming more general. It is proper, I believe, to call your attention to the comparison between gas and electricity. Only a few years ago gasoline was a by-product. When the automobile industry started, the ruling price was 10 cents a gallon. This price has constantly climbed to 14, 16, 18 and 20 cents, and even to as high as 25 cents in some localities. The garage owners are probably justified in opposing this rise, for the wholesale price is being advanced constantly, and the ultimate consumer, as usual, will pay the bill. On the other hand, the rates charged for electricity are constantly on the decline. The price of electricity used for charging batteries in the first electric vehicles was at the rate of 20 cents per kilowatt hour; a 15-cent rate soon followed, and for a number of years a rate of about 10 cents or thereabouts has been common. Today the user who charges his own single vehicle gets rates varying from 8 or 9 cents down to 4 or 5 cents per kilowatt hour, while the larger user, in certain localities, pays between 2 and 3 cents. The entire tendency is downward."

Reports were presented by committees on operating expenses, rates and charging stations, publicity, insurance, standardizations, etc. C. E. Michel then read a paper "Where We Stand Today" presenting some interesting facts and figures relative to the growth of the electric vehicle business. He said: "In St. Louis our revenue from charging during the first 6 months of 1912 increased at the rate of $1,000 a month or nearly 37 per cent. more than the previous year. It is estimated by Mr. Williams, of the Edison company, of New York, that the number of electrics in use in New York has increased 35 per cent. in the year ending June 1, 1912. Mr. Jones, of the Commonwealth Edison Company, of Chicago, estimates that in June, 1912, there were 200 electric vehicles under order but undelivered to Chicago business houses. One electric truck man sold single-handed $981,000 worth of trucks during the 1911 season and he did not make an apology for a single one of them.

Dr. M. Ekstromer, of Denver, in his paper on the Electric Vehicle in Denver, made the surprising announcement that in his city there is one electric pleasure vehicle to every 217 inhabitants, or more per capita than in any other city in the United States.

Street and Traffic Conditions As Related to the Electric Ve-

hicle, was the topic prepared by R. McAllister Lloyd. In it was suggested the need of dividing streets to provide a surface for motor traffic. It said: "As commercial vehicles drawn by horses have always been greater in number than pleasure vehicles, and as they are all destined to become motorized, accidents are likely to increase unless radical measures are taken to limit the speed of motor traffic. Up to the present time the electric vehicle for both passenger and commercial use has maintained a reputation for sane speed and ease of manipulation, but there seems to be a growing tendency for salesmen to advocate higher speeds, and if no protest is raised we shall find within the next few years the entire traffic of our streets speeded up to the pace set by the taxicabs. From an engineering standpoint it is perfectly practicable to increase the average speed of the electric vehicles, wagons and trucks, about 50 per cent., but I question the advisability of doing so. Is it not wiser to stick to the speeds now prevailing in the operation of electric trucks and advocate them for all methods of propulsion, not because electricity is inherently slower than gasoline, but because the interests of humanity are conserved by so doing?"

The forenoon session ended with the members discussing the papers. After luncheon they were taken for a drive through the historic sections of the Bay State. At the evening session there was an election of officers resulting as follows: Arthur Williams, president; F. W. Smith, vice-president; Harvey Robinson, secretary; Day Baker, treasurer; William H. Blood, Jr., P. D. Wagoner, G. N. Kelley, and E. S. Mansfield, executive officers for 3 years and William G. Bee for 1 year to fill an unexpired term. Papers were then presented as follows: Frank W. Smith on The National Co-operative Advertising Campaign of the Electric Vehicle Association of America; Dr. Harold Pender and H. F. Thompson, on Notes on the Cost of Motor Trucking; and Bruce Ford, on Some Recent Developments in the Lead Battery for Electric Vehicles.

The second day's session was called to order by the new president, Arthur Williams. Ex-President Blood took the floor and declared that the members who were refusing business were making a mistake and he further contended that every manufacturer of electric vehicles should have ample capital to increase his plant to meet orders. Stephen G. Thompson then delivered a talk on The Future of the Electric Vehicle in the East. He said among other things: "The industry is steadily gaining ground in its proportion to the total number of commercial vehicles in use. The reason for this is not far to seek, in that the market for commercial power wagons is found to be in those states that are the most densely populated. In New York, Pennsylvania, Illinois, California, Ohio, Massachusetts, Michigan and New Jersey, with a total population of nearly 40,000,000 people, more than 20,000 commercial vehicles are in daily operation, these states leading all the others in rank of population in cities of 25,000 inhabitants and more. Logically, therefore, the future of the electric vehicle lies in the East, this being the section of the densest population and hence of the most extensive street freight movement."

E. S. Foljambe presented a paper on the progress of the commercial vehicle in America with especial reference to the electric truck. He said: "The production of commercial vehicles has now reached the stage where the number in use will probably be doubled in 1 year. Taking the 30,000 commercial vehicles in use in 1912 as a basis it is safe to estimate that the production of these vehicles will exceed 40,000 during next year, more than doubling in 1 year the total number of trucks in daily use. It is impossible to ascertain the exact number of electric vehicles which have been produced, but estimates place the number of electric trucks between 7,000 and 8,000." He then advocated more advertising by the makers stating that much of the success of the gasoline cars was due to this feature. R. E. Russell then read a paper on Electric Vehicle Battery Charging Apparatus that was illustrated by different forms of appliances for this purpose.

Alexander Churchward opened the afternoon session with a paper on The Standardization of the Electric Vehicle. He stated that the speed of such vehicles had been increased from year to year because of the demand of the owners for faster machines. He said that he believed that a speed of 25 miles an hour was too high for a machine capable of easy control by a woman or child where the brake strain is 56 per cent. greater than at 20 miles an hour. He said that the manufacturers should agree on a standard maximum speed. This should apply, also to the commercial vehicles. Carl H. Clark then read a paper on The Electric Vehicle from an Insurance Standpoint, in which he brought out the fact that much caution and care is being taken now in wiring such vehicles, reducing the possibilities of fire in the trucks now being manufactured to a minor degree. Harold H. Smith then read a paper on The Edison Storage Battery in Service.

The convention then adopted a standard plug for charging, and also a standard bayonet lamp socket to be used in the future on all electric vehicles constructed. The convention also recommended that a flat rate be charged for garaging and a kilowatt hour charge for current be used in the future. The convention ended with a theater party in the evening. Many of the members remained here throughout th week attending the Electric Show now going on in Mechanics' Building.

New York Electrical Exposition Larger Than Ever

THE Electrical Exposition of 1912 opened at the Grand Central Palace on October 9 and will continue until October 19. In its general scope it is larger and more complete than any of its predecessors, but in the way of automobile trucks and pleasure cars the representation is not so large as has graced a number of former shows.

Ten companies are exhibiting. One company failed to receive its show car in time for installation. The exhibitors are as follows:

Anderson Electric Car Company, Detroit: Detroit electric pleasure cars.

Atlantic Vehicle Company, Newark: Two models of trucks.

Baker Vehicle Company, Cleveland: Pleasure cars and 2-ton trucks.

Champion Electric Vehicle Company, New York: 750-pound wagon and 1-ton truck.

Buffalo Electric Vehicle Company: Buffalo electrics.

General Motors Truck Company, Pontiac, Mich.: Model 5-ton truck.

General Vehicle Company, Long Island City: Trucks of assorted sizes.

The Lansden Company, Newark: Municipal and commercial trucks.

The Studebaker Corporation, Detroit: Assorted trucks.

Ward Motor Vehicle Company, New York: 1,000-pound wagon and 1-ton truck.

All told there are ten models of pleasure automobiles representing the Anderson, Baker and Buffalo companies. The line of trucks is more complete, consisting of eighteen models made by eight companies.

An important feature of the exhibition is the testing track that has been established on the third floor. The three companies showing pleasure cars have one or more of their cars assigned to the testing floor and running demonstrations are given at each

session. In connection with this feature of the show there has been installed a treadmill arrangement upon which novices can be schooled in the first principles of operation.

The attendance on opening day was excellent, it being estimated at well over 5,000 and all of the automobile exhibitors were kept busy explaining the qualities of their wares.

While storage batteries were in evidence and many designs adapted for automobile uses were exhibited, an inspection of this department of the show brought out the fact that the line of 1913 products is practically identical with what the makers offered for the year of 1912. No improvements to speak of have been made in lead batteries, and the same refers to the non-sulphuric type of accumulators. The exhibitors of batteries were: Edison Storage Battery Company, Orange, N. J.; Gould Storage Battery Company, New York City; Philadelphia Storage Battery Company, Philadelphia, Pa.; Electric Storage Battery Company, Philadelphia, Pa.

Other exhibits of interest to automobile engineers and owners were the lighting equipments of the Wagner Electric Manufacturing Company, St. Louis, Mo., and the Universal Electric Welding Company, Long Island City, N. Y.

Investigation of Relative Costs

What will probably prove a most important factor in the impartial and scientific calculation of delivery costs is the investigation now being carried on by the Massachusetts Institute of Technology of the relative costs of horse, gasoline and electric delivery service. Findings of these researches have been published from time to time within the last 6 months, and while absolutely conclusive and satisfactory for the engineer and technical man, the results have not yet reached the stage where the public at large appreciates their importance.

At the Electrical Exposition and Automobile Show of 1912, as part of an engineering exhibit showing facts of interest in regard to central station service, certain figures given out by the technology researchers are presented in graphic form. An effective color scheme is also employed to carry home to the average spectator the essential facts of delivery service cost, whether by horse, gasoline truck or electric vehicle service.

In comparing the cost of gasoline and electric vehicle delivery, a 10,000-pound truck is used as the standard and the cost is divided under three headings, fixed charges, maintenance and operating, designated by three colors, and reckoned in cents per mile of travel. Thus for the electric vehicle the fixed charge is 10 cents, the maintenance 15, and operating 22, making a sum total of 47. For the 10,000-pound gasoline truck, the sum total is 61, of which 17 is assigned as fixed charge, 18 for maintenance, and 26 comes under the heading of operating.

Horse delivery is calculated on a basis of cost in cents per trip, for a two-horse wagon. This, however, includes the cost of three horses, allowed as necessary to keep a two-horse team in daily working condition. Here the fixed charge becomes a little more than 1 cent a trip, the maintenance drops below that sum, while the operating cost rises to 6 cents per trip. This chart, however, does not attempt to show the comparative amount of territory covered by the horse team in contrast to the trucks.

In another group of charts, the subject of package delivery is taken separately. Here the cost is reckoned in cents per mile with a 1,000-pound gasoline and electric wagon respectively. The same divisions of fixed charges, maintenance and operating costs are continued. In package delivery service, one learns that the fixed charge in cents per mile for a ½-ton gasoline wagon is 6.5, maintenance is 4.5 and operating cost about 20. For the same weight electric truck, the fixed charge is 5 cents, maintenance 4.5 and operating about 14. With a horse-drawn wagon, allowing two horses for daily work, the cost in cents per delivery comes under 8 cents, and is divided into 1 cent for fixed charge, 3 cents for maintenance and 6 cents for operating. Here again no attempt is made to compare the amount of territory which the motor trucks would cover in excess of that traversed by a one-horse team.

70,000 at St. Louis Show

Record Attendance Marks Most Successful Automobile Exhibition Ever Held in the Mound City

Automobiles, Trucks and Accessories Worth $1,000,000 on View—200 Cars Sold Outright

ST. LOUIS, Oct. 14—With a record attendance reaching a grand total of approximately 70,000 the most successful show ever held in this city closed tonight. It was given by the St. Louis Automobile Manufacturers and Dealers' Association. The $1,000,000 display of pleasure cars, trucks and commercial vehicles, accessories and tires attracted visitors from all parts of the Middle West.

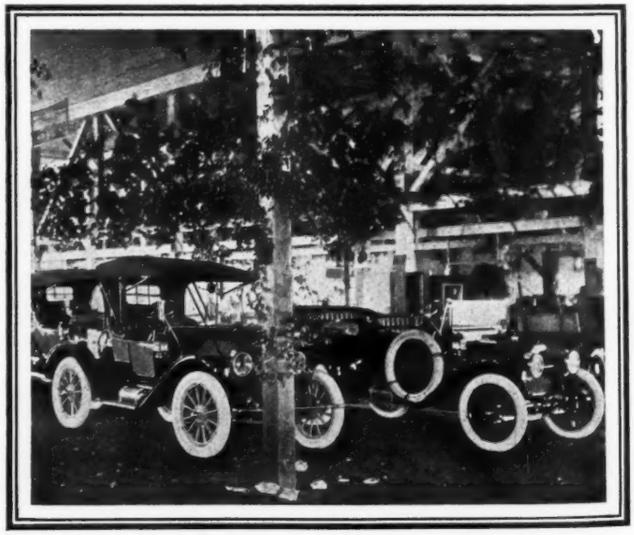
The exhibits included 300 1913 models of seventy makes of pleasure cars and more than sixty models of commercial vehicles were displayed.

As a business getter for the exhibitors the show has been unsurpassed. The public repaid the exhibitors for their expenditure of money, time and effort. It is estimated that 200 machines were sold outright and 3,500 prospects were acquired.

Estimates as to the amount of business that will be done in this city in the next year ranged from $9,000,000 to $15,000,000. Counting the sales which will probably be made in the St. Louis territory by St. Louis agents or sub-agents the amount of business has been estimated as high as $200,000,000. This estimate was made by one of the largest distributors of the St. Louis territory and included the larger part of Missouri, Illinois, Texas and a part of the south and southwestern states.

Negroes Lead as Alabama Chauffeurs

MONTGOMERY, ALA., Oct. 14—Only 36 per cent. of the licensed automobile drivers in this state are white. Negroes seem to have an established place in this field. This is the result of the lower wage for which they will accept the service. The average age of chauffeurs is 22 years, but two men in the state having licenses who are over 30 years of age. The average height among the 3,224 men holding licenses is 5 feet 9 inches. The average weight is 160 pounds. In order to enforce the state automobile tax more thoroughly this year every police officer in the state has been made a deputy collector of automobile licenses.



Partial view of the St. Louis, Mo., automobile show

Contest News of the Week

Twelve Entries in Phoenix and San Diego Road Races—Chicago Athletes Win Team Match Series

Disbrow Lowers Track Record at Springfield, Ill., by 2 Seconds—Also Beats 2-Mile Mark

PHOENIX, ARIZ., Oct. 14—Entries for the Desert road race closed last week with an even dozen contenders named. The list includes the following: Three Cadillacs, Buick, Franklin, two Americans, Schacht, Simplex, Hupmobile, National and Mercedes.

The Automobile Club of Southern California guaranteed only ten entries and the list leaves a margin of two contestants on the right side.

In addition to the Los Angeles cars there will be a division from San Diego, sanction for which has been given by the American Automobile Association. Under its terms the San Diego club agrees to secure at least eight entries.

The start of both divisions will be on Saturday, October 26. The Los Angeles cars will follow a route made up of certain sections used in former races but will not go to San Diego as it did last year. The San Diegans will follow a route through the southern part of San Diego and Imperial counties, skirting the Mexican line in places. The two routes join a few miles west of Yuma, where the night control has been established.

The cars will be ferried across the Colorado at Yuma and the start to Phoenix will take place the following morning. In order to smooth out any possible friction in the arrangements, the A. A. A. has ordered its Arizona representative to take charge of the contest at Yuma. Under his instructions, this official will line up the Los Angeles cars on the eastern side of the river at 5 o'clock in the morning and will start the column ahead of the San Diegans. The latter contenders will start 5 minutes after the last of the Los Angeles cars is sent away.

From Yuma to Phoenix it is likely that a wild race will ensue between the representatives of the two California cities despite the rough roads and shifting sands.

Athletes Beat Motorists in Tour

CHICAGO, Oct. 14—Winding up the 1912 series of team matches, the Chicago Athletic Association's representatives decisively defeated the Chicago Automobile Club in the fall run for the Allen S. Ray and Carleton White trophies, making the sixth victory for the Cherry Circle in the seven times the two clubs have clashed. Nine of the C. A. A.'s ten cars were perfect, while the C. A. C. had four of its ten penalized. A new scheme was tried in the run of Saturday—that of giving 5 points credit to a team for each perfect score it turned in. As the C. A. A. only had 13 points against it and was credited with 45 for nine perfect scores it won the match with a mark of 32 plus. On the other side, the C. A. C. had 263 points against it and only 30 points credit, so its score was 233 minus. Because of having the best total the C. A. A. won the Ray trophy and because of having the greater number of perfect scores it added the White cup to its already large collection.

The run was a 1-day affair instead of the usual 2, the noon control being located at the Hazelden farm of George Ade, the playwright, at Brook, Ind., a distance of 90 miles. Threatening weather the night before, when it rained hard, kept down the size of the field and so only twenty cars went to the tape. But those who did drive had a most enjoyable outing, for the sun shone, the roads dried up and it was a joy ride both ways. At Ade's the Daughters of Ruth served the luncheon and at the finish the losing team paid for the dinner at the South Shore Country Club.

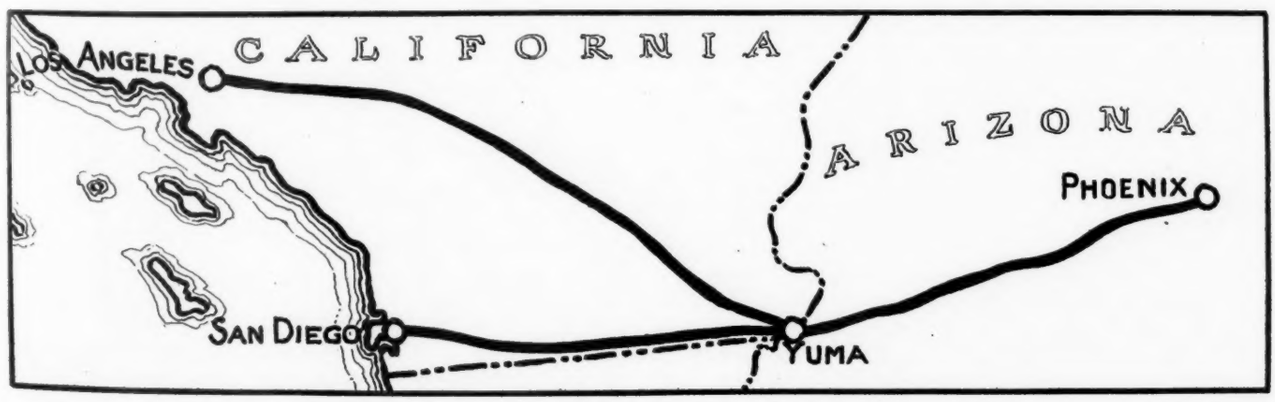
Penalties exacted were mostly for stalled motors but in the case of A. M. Robbins, who got the maximum penalty of 250 points, broken shock absorbers brought on penalization that put the C. A. C. out of the running completely. It took Robbins so long to complete the repairs on the accessories that he was just reaching the noon control as the last car pulled out on the return journey.

Local Records Go at Springfield

SPRINGFIELD, ILL., Oct. 12—Two local mile track records were broken here today at the motor races held in connection with the state fair in progress this week. Louis Disbrow, driving the Simplex Zip, lowered by 2 seconds the track record for the mile of 53 1-5 seconds held by Barney Oldfield in the Blitzen Benz. Disbrow also lowered Kirscher's record for the 2 miles on this track. These were two of the nine events of the meet which were witnessed by 25,000 people. Summaries follow:

Car	Driver	Time
5-MILE—CARS 231-300 CU. IN.		
Case	Nikrent	5:34.75
White	Ulbrecht	
5-MILE—CARS 301-450 CU. IN.		
Case	Endicott	5:10
Interstate	Madden	
Stutz	Luttrell	
1 MILE AGAINST TIME		
Simplex	Disbrow	:51.20
5-MILE HANDICAP, 300 CU. IN.		
White	Ulbrecht	5:13.20
Case	Nikrent	
Staver	Monkmeier	
Falcar	Parker	
3-MILE—CARS 300 CU. IN.		
Simplex	Disbrow	2:56.80
Case	Endicott	
Hotchkiss	Kilpatrick	
Stutz	Luttrell	

Car	Driver	Time
ILLINOIS CLUB CHAMPIONSHIP—10 MILES		
Case	Nikrent	10:28.50
Stutz	Luttrell	
Falcar	Parker	
2 MILES AGAINST TIME		
Jay-Eye-See	Disbrow	1:47.40
	1:47.80 previous record	
5-MILE RACE		
Simplex	Disbrow	4:36.80
White	Ulbrecht	
Case	Endicott	
Hotchkiss	Kilpatrick	
Staver	Monkmeier	
Falcar	Parker	



Map showing race routes for Phoenix and San Diego races

Paraffin Carbureter Tests

Stewart-Morris Instrument Gives Excellent Results with That Fuel on 2,000-Mile R.A.C. Trial

THE following account of the R. A. C. tests made upon the Stewart-Morris paraffin carbureter is based upon an article appearing in *The Motor* (London).

The Stewart-Morris paraffin carbureter is controlled by the Stewart Precision Carbureter Company, Ltd., London, and tests on a 27.3-horsepower Pathfinder car fitted with one of these carbureters, and running on paraffin have been made recently. This is the same car which has been through the 2,000 miles R. A. C. test.

The design of the carbureter is such that while intrinsically only a single instrument, it serves a dual purpose, insomuch as one may start up for simplicity's sake with petrol, and when the engine has warmed, the petrol tap is turned off and paraffin takes the place of the more expensive fluid. There is no need for any adjustment or attention to the carbureter, beyond merely turning off the tap which cuts off the petrol supply when the engine is warm, the said tap being part of a three-way cock, so that either of the liquids may be passed to the carbureter or both cut off, according to the requirements of the case.

A basic differentiation from ordinary practice is that the suction of the engine conveyed through the ordinary induction pipe has no effect whatsoever on the delivery of the fuel from the jet and is not really intended to suck up the fuel from the jet orifice. At the base of the sectional drawing is seen a T union through which the fuel enters the circular chamber R. In the center of this circular chamber is a light rod, connected to the plunger Q, which, working in the cylinder constitutes a dashpot control. Following the small central rod up the center of the cylinder, it will be seen that it passes, at the point O, through a hole in the center of the cap P. This light rod is tapered in construction so as to constitute a tapered needle valve. It will be seen, therefore, that if we assume the presence of paraffin in the chamber R, under a certain pressure, there being no other means of escape for it, it will be sprayed out in an atomized form round the orifice surrounding the needle valve, and it will also be understood that as the needle valve rises or falls so the orifice surrounding it is increased or decreased, the action being entirely automatic. With this paraffin carbureter, the fuel is delivered under a pressure of some 4 pounds to 5 pounds to the square inch, and it is this pressure which causes the spraying of the fuel from the jet, and not the suction of the engine. The description of the operation of atomized paraffin from the pipe D follows. On the left is an opening C, through which the air which mixes with the paraffin to constitute the explosive mixture is drawn. From D the pipe runs to the exhaust manifold, enters into it, passes through a certain length of it, and on making its exit is connected again to the pipe E, situated just above D on the body of the carbureter. In this way the fuel and air are carried in a gasified state to the vaporizer, are carried bodily through the vaporizer, and come back again to the body of the carbureter as a fixed gas. Having, then, a properly mixed gas at the pipe E and entering into the space marked F, the mixing chamber. At the top of the mixing chamber is a plain valve marked J, which is accurately weighted, and in the base of the said valve there are a number of slots, so that when it is raised from its seating B, through the medium of the suction of the engine, the gas in the mixing chamber can pass through to the induction pipe in the ordinary way. The needle valve is also connected to this valve at the top, so that as the valve rises according to the suction of the engine, so the needle valve is moved in synchronized correlation, thus automatically delivering the correct proportion of fuel. To the left of the mixing chamber F is an auxiliary air-inlet valve, the control of which is effected through a link connection with the throttle valve, and this supplies a sufficient quantity of air to insure a correct mixture up to about 70 per cent. of the full power of the engine, after which a still further supply of air is allowed to enter, the control being effected either by hand or by means of the throttle-controlling mechanism.

It is, of course, the question of the extra air which is always the main feature likely to cause trouble in the design and production of a paraffin carbureter, but in the case of the new Stewart-Morris design the arrangement appears to be quite satisfactory. The suggestion has been advanced that the suction of the engine would have an effect upon the flow of the fuel, as the main air supply is drawn past the orifice through which it issues, but the orifice in question is so minute, and the pressure within so great in comparison with the suctional effort, that one may practically neglect its action. The other illustration shows the method of fitting the carbureter, and the comparative simplicity of the vaporizing media adopted, while in general dimensions the size of the carbureter itself is by no means out of the ordinary.

The R. A. C. Certificate

Certificate of Performance, No. 355, in a 2000 Miles Trial of a Stewart-Morris Paraffin Carbureter (Under the Open Competition Rules of the R. A. C.) August 30 to September 11, 1912.

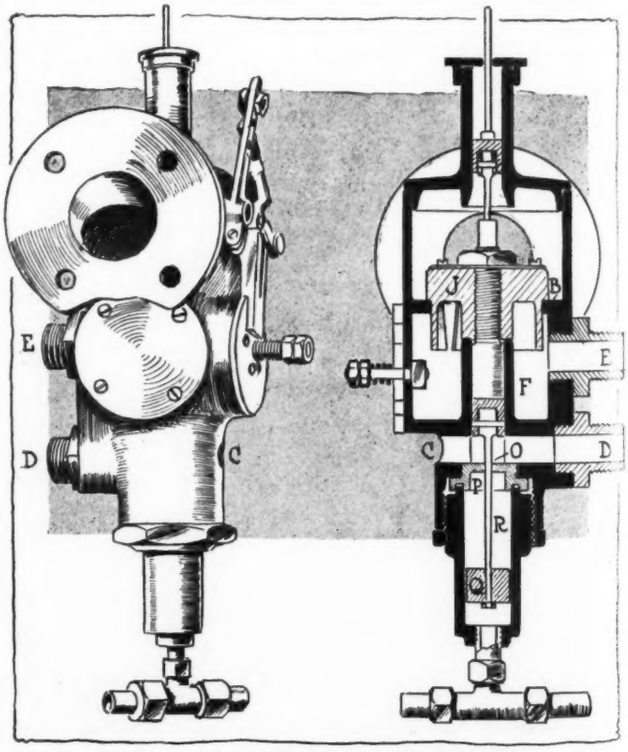
This is to certify that a Stewart-Morris paraffin carbureter was entered for trial by Messrs. The Stewart Precision Carbureter Co., Ltd., of 199, Piccadilly, London, W.

The weight of the carbureter, not including the vaporizer within the exhaust manifolds, but including the pipes leading thereto, was 9 lb.

The carbureter was fitted to a 27.3 h.p. R.A.C. rating "Pathfinder" car. The following are the particulars of the car:

Weight (front axle)	1507 pounds
Weight (back axle)	1963 pounds
Total weight	3470 pounds
Average weight of load during trial	356 pounds
Average total running weight	3826 pounds
Bore and stroke of engine	105 millimeters, 133 millimeters
Number of cylinders	4
Gear ratio on top gear	3.7 to 1
Size of tires	34 inches by 4 inches
Wind area of body	14.8 square feet

The carbureter was fitted in the usual place. The paraffin tank was fitted between the rear spring hangers, the fuel being



Section of Stewart-Morris paraffin carbureter

lifted to the carbureter by pressure. The petrol for starting was carried in a small tank in the boot, the same pressure system being used for both fuels. Petrol and paraffin pipes led to a three-way cock on the heel-board, thence to the carbureter. The pressure was not sustained automatically, but by means of a hand pump. The pressure was not kept constant, but was usually between 5 and 6 pounds per square inch. It was increased when approaching any considerable hill, and was put up to 7 pounds per square inch up Sunrising Hill.

The control was by throttle and cold air lever. The latter was not used much, on an average about three times a day.

On some occasions when the engine was started on petrol a device was employed which allowed petrol to be injected into the induction pipe.

The paraffin oil was an oil marketed by Messrs. Carless, Capel and Leonard, as "Phœbus" oil. Its specific gravity was .807 at 13 degrees C.

The following is a synopsis of the ways in which the engine was started during the trial:

The engine was started direct on paraffin twenty-three times, the longest stop after which this was done being 17 minutes. On four occasions unsuccessful attempts were made to start on paraffin direct.

On nine occasions the engine was started on paraffin, petrol having previously been injected into the induction pipe, the longest stop after which this was done being 45 minutes.

The engine was started on petrol twenty-one times, the shortest period after which the fuel was changed to paraffin was 10 seconds, the longest being 4 minutes 20 seconds. The variation in this time appeared to be dependent on the duration of the previous stop. On six occasions the engine stopped when the change of fuel was made, being subsequently restarted on paraffin.

The total distance covered during the trial was 2003.3 miles, 1001.0 miles being run upon the road upon the club's six standard routes, and 1002.3 miles upon Brooklands track.

Road Trial.—The average speed (running time only) was 19.8 miles per hour. The quantity of paraffin used was 47.88 gallons, being a consumption of 20.91 miles per gallon or 35.70 ton miles per gallon. 1.05 gallons of petrol were used during the road portion of the trial.

Brooklands Tests.—The 1002.3 miles upon the track were covered at an approximately constant speed of 35 miles per hour. The paraffin consumed was 46.41 gallons, being a consumption of 21.59 miles per gallon or 36.88 ton miles per gallon. 0.76 gallons of petrol were used during the track portion of the trial.

Slow Engine Speed Test.—The engine was run idle for 10 minutes on paraffin at an average speed of 352 revolutions per minute. The speed during this time was very regular, and no misfiring was apparent. At the end of this period the throttle was opened to its fullest extent as quickly as possible, the ignition at the same time being advanced more slowly. The engine accelerated regularly without hesitation or misfiring.

Slow Car Speed Test.—The car was driven on paraffin, on top gear for 1.5 mile at 6.14 miles per hour, the speed being kept as constant as possible. The car was then accelerated, 39.2 miles per hour being attained in 51 seconds. The engine fired regularly during the slow running except during the last 200 yards, when there was occasional misfiring.

Consumption Tests.—The following tests of the consumption of paraffin were taken:

Speed Miles per hour	Consumption Miles per gallon	Ton-mile per gallon
10.6	23.12	39.43
14.9	23.81	40.66
20.1	26.69	45.58
25.2	27.19	46.44
30.45	23.94	40.89
35.8	17.45	29.81

Hill Test.—The car was timed up the test hill, the speed being 11.16 miles per hour. The weight of the car and load in this test was 3,557 pounds.

Condition After Trial.—At the conclusion of the trial the cylinders of the engine were removed. There was a somewhat considerable amount of deposit upon the piston heads of No. 1 and No. 4 cylinders, while that on the piston heads of No. 2 and No. 3 cylinders was not so great. The cylinder heads and valve ports had slight deposit, but were somewhat sooty. The valves had no deposit, but were somewhat sooty. The sparking plugs were somewhat sooty. The engine showed signs of over-lubrication.

General Remarks.—Throughout the trial there was no misfiring with the exception of that mentioned above in the slow car speed test. During the trial 1 minute and 1 4-5 seconds was taken to check the adjusting nuts of the taper needle. With this exception no work was done upon the carbureter or upon the engine. The fuel pressure was at that time 4.5 pounds.

The temperature of the cooling water was taken at midday each day, and was found to vary between 94°C. and 96°C.

Throughout the trial the engine was stopped by turning off the fuel supply and not by switching off.

Harking Back a Decade

What the Motoring Publications of 10 Years Ago Had To Say on Live Matters of the Day

FROM *The Automobile and Motor Review*, October 11, 1902: The Peerless racing car that appeared recently at Brighton Beach was the first 1903 model to be introduced in New York. The motor has two cylinders, 4 1-2 inches in bore by 5 1-2 inches stroke. It is equipped with sliding gears in the transmission in place of the small individual clutches formerly used.

Word comes from Paris that William K. Vanderbilt, Jr., is now backing the manufacturing operations of Leon Bolee, the French constructor, who is engaged in building a small number of automobiles of the Daimler-Mercedes type intended for the American market and listed at $6,000 each.

In the recent British reliability trials, the honors in the steam division must be accorded White 29, a 6-horsepower car driven by Mr. White himself. The car finished with a clean score, being credited with the maximum number of points, 1,800, for the whole test.

The hilly and roughly paved streets of Baltimore are probably accountable for the lack of progress that has been made in that city by the automobile so far. There are only about seventy automobiles owned in the city.

California and the whole Pacific Coast has shown a wide interest in the automobile. The Golden State Automobile Company is preparing to manufacture an 8-horsepower car at San José. The motor will be of the double-opposed type and the transmission will be by rawhide pinion and iron gears, so that it will be noiseless.

Exports from New York for the week ended October 4 amounted to $4,000. This is a considerable falling off from recent weeks.

At the Republican convention at Saratoga September 24, a plank for the platform of the party in the State of New York was adopted urging the construction and maintenance of good roads.

The annual reliability run of the Automobile Club of America started from New York on Wednesday last and will be completed next week. Additional entries were received, bringing the total number to seventy-nine. Tuesday was spent in weighing the cars. A full report of the run will appear in next week's issue.

Frederick H. Elliott, secretary of the Automobile Club of Syracuse, will soon resume his work of organizing a New York state association of automobile clubs. The object of the state body will be to prevent hostile legislation. In speaking of the persecution to which automobilists are frequently subjected, Mr. Elliott said: "There are very few persons, either peace officers or plain citizens who are capable of telling how fast an automobile is going. Consequently testimony based upon conclusions of witnesses incapable of judging the facts must be unreliable."

Informal applications for space at the Chicago show, which will be held in February, number fourteen. The diagrams will be issued next week and allotments will be made October 15.

The Peerless Motor Company, of Cleveland, has filed incorporation papers in West Virginia. The capitalization is placed at $300,000. I. M. Blanchard, L. H. Kittredge, John McGregor, Jr., F. A. Quail and G. B. Slidell, of Cleveland, are incorporators.

H. Ward Leonard, formerly third vice-president of the National Association of Automobile Manufacturers, has been elected first vice-president to succeed A. L. Riker. Frederic Martin Lande was chosen second vice-president. Charles Clifton was made third vice-president. Harry Unwin was made secretary and Windsor T. White has been elected a director.

Disco Electric Starter

Two-Unit System Including Motor, Generator and Storage Battery Adopted in Addition to Acetylene Type

THE new Disco starter is of the electric type. For some time the Ignition Starter Company, of Detroit, Mich., has been well known for its activities in the acetylene starter field and it is with great interest that the construction of the new device may be noted because it is the first time that a concern which has been devoted to the acetylene starter has included one of he rival type in its line. Both types of starter will be carried in future by this concern which has recently improved its acetylene product and brought it out under the name of the 1913 model Disco.

A two-unit system is used for starting, lighting and ignition. The system is complete in that no other electric apparatus is necessary when the entire Disco system is employed. All the electric functions throughout the car are taken care of and the system is made automatic as near as it is possible for an electric starting, lighting and ignition system to be. The apparatus consists primarily of a dynamo, a motor and a storage battery. Suitable connections and electric devices for automatically regulating these three principal units form the remainder of the system.

The electric motor has no other purpose than to start the motor. It is mounted on the side of the crankcase and connected by gearing to the flywheel. The amount of reduction between the motor and the flywheel depends upon the size of the motor to be started and the compression pressure against which the motor has to pull. In the test motor at the Disco works, which has a bore of 4 7-8 inches and a stroke of 6 inches, with a compression pressure of 75 pounds, the total reduction between the motor and the flywheel is twenty to one. On a motor of lower compression or smaller size, the reduction would not have to be so great. The ratio of reduction is variable as is the method of mounting the starting motor upon the structure of the crankcase of the automobile motor. To take the motor the flywheel will have to be geared in the same manner as is common with the electric systems now found on the market.

The amount of current consumed by the motor when starting the engine will vary with the motor upon which the starting system is applied. On the larger six or four-cylinder motors the amperage which will be drawn when starting the motor will be much higher than in the smaller type. For instance with a motor of 4 1-2 inches bore and 5 1-2 inches stroke having a compression pressure of 60 pounds which is common in ordinary touring practice the motor will draw 65 amperes when spinning the flywheel at the rate of 120 revolutions per minute. On a heavier motor the amperage will rise considerably as may be expected from the added effort necessary in producing the turning moment on the geared periphery of the flywheel. To take an example of a heavier motor the current required with a bore of 4 7-8 inches and a stroke of 6 inches is 90 amperes when turning the flywheel 110 revolutions per minute. In the latter case the gear reduction was twenty to one as mentioned above which gave a speed of 2,200 revolutions per minute to the starting motor.

It must be remembered when estimating the current required with an electric starting motor that everything depends upon how stiff the motor is, whether it is to be started dead cold or whether the motor has just been stopped after a long run. Carburetion difficulties under adverse climatic conditions will necessitate a longer spinning of the motor than when everything is favorable for a quick start. No compression release is required with the Disco electric system which is powerful enough to start the motor against full compression.

The voltage question is another upon which the makers of electric starters do not seem to agree. The Disco system works entirely at 12 volts. This is a very practical voltage in that the lighting system is readily handled with it. The ignition system which generally works at 6 volts through the primary circuit can also be adequately taken care of by a 12-volt system. The starting motor is made only in the 12-volt size. It is series wound and can be connected by any means desired to the flywheel of the large motor. The electric starting motor is illustrated in Figs. 1 and 2. The latter illustration shows the plan view with the only two wires required in its operation while the elevation is given in Fig. 1.

The generator is entirely automatic in its action. It is cut into the storage battery when the motor speed has reached a point that approximates a rate of 7 miles per hour of the vehicle when running on direct, at a reduction of about three to one to the driving wheels. Below this speed there is no connection between the battery and the dynamo so that there is no possibility of the storage battery discharging back through the generator when the car is standing at the curb. The current for the lamps and the ignition, if the motor is running idle, is furnished at this time by the storage battery. The charging curve of the dynamo commences at a 7-mile an hour vehicle speed and continues to rise until it reaches a maximum at about 15 miles per hour. At this point it starts to flatten, the slope of the curve gradually becoming more slight and at 25 miles an hour it drops off. The charging curve can be varied, however, and can be made to suit conditions by the manufacturers who adapt the system to the vehicle upon which it is to be placed.

The switch which automatically cuts the generator into the battery circuit and out again when it does not produce a sufficient current to charge the storage battery, is regulated entirely by armature reaction and not by the actual speed of the motor except that the latter will govern the reaction. By this means, however, the tendency for the switch to be continually cutting in and out when the speed of the vehicle closely approximates 7 miles per hour, is obviated to a large extent.

The batteries are carried in the usual manner beneath the frame of the car. A voltage of 12 is required and this condition can be filled by a battery which will be light and yet have a sufficient current capacity to light the lamps for a long time, when the motor is not running. The ignition feature is optional and may be added to the starting system if desired by the purchaser. When the ignition feature of the Disco electric system is omitted it will not in any way interfere with the other units which are connected up in the same manner as they would have been had the wiring been taken from the storage battery.

The Disco people have not brought out this starting system suddenly. They have been working upon it vigorously during the past year and were among the first to recognize the commercial value of a high grade electric starting and lighting system. The units have been carefully refined and it will no doubt be one of the highest priced outfits upon the American market at the present time.

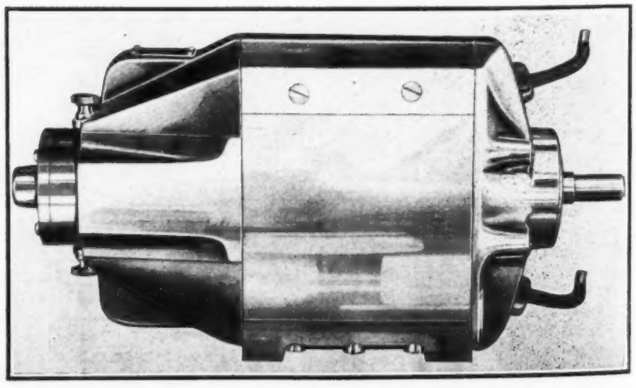


Fig. 1—Side elevation of the Disco electric starter

British Retain Tax Rating

Committee Appointed by the Treasury Finds Present Horsepower Taxing System Satisfactory

LONDON, ENG., Oct. 11—The committee appointed by the treasury in order to investigate the horsepower rating of automobiles has now issued its report. The committee was appointed on December 6, 1911, with the following reference:

To consider the provisional regulations which have been made under section 86 (2) of the finance (1909-10) act for determining the horsepower of motor cars, and to report whether any amendments are desirable, with special reference to the equitable treatment of steam cars and electric cars.

The committee has held a number of meetings, and has had before it seventeen witnesses representing manufacturers, and the various institutions and societies in connection with the motor car industry. The main point to be considered by the committee related to the effect of stroke bore ratio, a topic which has been much discussed in recent years by various societies and institutions concerned in the manufacture of motor cars. For example, according to one formula put forward by the Society of Automobile Engineers based upon a large number of engines, the power of an engine of which the bore and stroke are equal should be 33 per cent. less than an engine of similar bore in which the ratio of stroke to bore is 2 to 1. The recommendation of the committee, after hearing the whole of the evidence, is that the present rating now enforced be retained as regards the taxation of motor vehicles. The committee believes that the majority of those interested in the manufacture of motor cars are in favor of this course, not only because the method of rating is substantially fair as between one car and another, but also because any change of system would lead to a great deal of inconvenience to persons who have made arrangements for manufacturing or dealing in cars in classes suggested by the present system. In view of the fact that an engine with a longer stroke consumes more gasoline by reason of developing more power, therefore this engine pays an additional tax on gasoline.

With regard to old cars, a number of witnesses represented that the horsepower of cars made a number of years ago was considerably less than that of modern cars of the same rating. A grievance is undoubtedly felt by many owners by reason of the high tax on a car of little value. The committee however, has not considered it within its province to make any recommendation as to the taxation of cars which have depreciated in value in the ordinary way.

Steam cars have hitherto been taxed in the same manner as the petrol car, that is the steam engine in a car is taken as equal to that of the petrol engine having equal cylinder area, and where the engine is double acting the rating is correspondingly increased. Since the real horsepower is independent of the engine dimensions, and depends solely on the boiler, the regulations now in force are obviously incorrect. The committee recommends that in regard to steam cars 3 square feet of heating surface should be taken as equivalent to 2 square inches of piston area. which may be regarded as giving 1 horsepower in a gas engine.

The number of electric motor cars is comparatively small, and are all used in this country for one kind of service, namely, town work. Most of these vehicles are fitted with motors rating at 8 horsepower, and as the result of experiments carried out by the committee it is found that at 20 miles per hour about 7 1-2 horsepower has been used. They are of the opinion that these cars can be described with sufficient accuracy as exceeding 6 1-2 but not exceeding 12 horsepower, and recommend that the regulations dealing with them be amended accordingly.

The substance of recommendations of the committee is most conveniently summarized in the form of the following regulations for the determination of horsepower, which might, in the opinion of the committee, take the place of the provisional regulations now in force:

1. For the purpose of these regulations the horsepower of any motor car deriving its motive power wholly from an internal combustion engine worked by a cylinder or cylinders shall be taken to be:

(a) in the case of a single cylinder engine the horsepower attributed to the cylinder of the engine;
(b) in the case of an engine having two or more cylinders the sum of the horsepowers attributable to the separate cylinders.

2. The horsepower attributable to any cylinder of an internal combustion engine shall be deemed to be equal to the square of the internal diameter of such cylinder measured in inches divided by a numeral.

(a) in the case of a single-acting cylinder having a single piston, the numeral used as divisor shall be 2.5;
(b) in the case of a single-acting cylinder having two pistons, the numeral used as divisor shall be 1.6.

3. The horsepower of any motor car deriving its power wholly from a steam engine shall be taken to be proportional to the effective heating surface of the boiler supplying steam to such an engine, at the rate of 1 horsepower for every 3 square feet in such effective heating surface, and the effective heating surface shall be taken to be:

(a) in the case of a boiler having horizontal or approximately horizontal tubes, the whole of the surface of the tubes which is exposed to the flame or hot gases;
(b) in the case of a boiler having vertical or approximately vertical tubes, half of that surface of the tubes which is exposed to the flame or hot gases.

4. Any motor car deriving its motive power from an electric motor or motors shall be deemed to be of a horsepower exceeding 6 1-2 but not exceeding 12.

5. In measuring cylinders and boilers, and in calculating horsepower, fractions of inches and feet and fractions of a unit of horsepower are to be taken into account.

6. Where it appears that in consequence of the exceptional design or construction of the engine of any motor car the horsepower as calculated under the preceding rules is substantially less than the average power which the engine would develop in continuous use on the road if there were no restrictions on speed other than those imposed by the car itself, then such average power shall be taken as the power.

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EDMONTON, ALTA., Oct. 14—Statistics compiled from government reports show that in comparison to population Alberta has more automobiles than any other province in the Dominion of Canada, there being 300 cars or one to every 124 persons, estimating the population at 374,663. Manitoba is second, having one car to every 152 persons of its population of 445,614, while British Columbia has third place, reporting one automobile for every 165 persons of a population of 392,480.

Saskatchewan is fourth. It has 2,537 cars, or one for each 194 persons of its population of 492,432. Ontario has the largest number of cars reporting 7,338, or one for each 344 of a population of 2,523,208. Nova Scotia has the smallest number of automobiles, there being one to each 852 of its population, which is placed at 492,338. New Brunswick with a population of 351,889 has 594 automobiles.

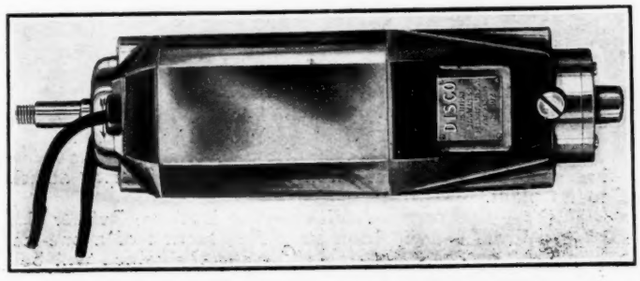
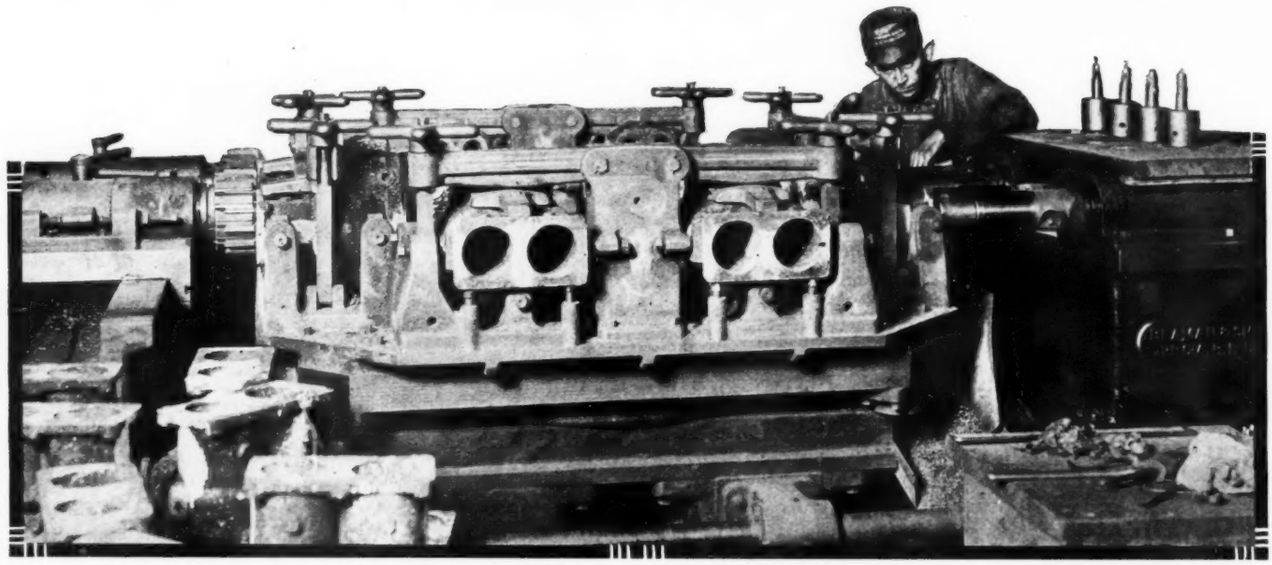


Fig. 2—Plan view of Disco electric starting-motor

Factory Miscellany



Machine built especially for use in the shops of the Packard Motor Car Company, Detroit, Mich., for boring and milling cylinders

Made specially for the Packard shops, the machine shown in the above illustration is more than justifying the expense which must necessarily be connected with the design and manufacture of a special machine. The particular work which this large machine takes care of is the boring and milling of cylinders. The large turntable which holds the work in its proper place takes eight cylinder castings at a time, that is to say, sixteen individual cylinders. This machine completely mills, bores and faces eight complete cylinder castings in 10 minutes. It can be operated steadily throughout a working day and during that time will turn out 60 complete jobs. The machine is operated by two men, one of whom takes care of the setting up of the work, while the other operates the mechanism connected with the machine. The latter operation consists in changing cutters and stopping and starting the mechanism after each new job is ready for the milling and boring operation. The lubrication and general care of the machine can also be taken care of by the second man, while the man who sets up the work can do this so rapidly that it does not interfere in any way with the steady manipulation of the machine. When this machine finishes its work a quick shift is made to a second milling table where ports, intakes and exhaust openings are milled to gauge. Altogether the arrangement is a great time-saving factor.

MERCHANTS Visit Kissel Factory—The Milwaukee Merchants and Manufacturers' Association recently made a pilgrimage to the main plant of the Kissel Motor Car Company, Hartford, Wis. As the company is about to establish a branch factory in Milwaukee, Wis., the visit was of particular interest to the business men who made the trip. Twenty-four cars met the party at the station and took them to the company's plant, where they were able to observe the building of automobiles at the height of the busy season. The accompanying photograph shows the party assembled before the factory.

Jackson's Factory Plans—The Jackson Motor Car Company, Jackson, Mich., contemplates erecting a branch factory, to cost approximately $200,000.

Planning Krit Addition—The Krit Motor Car Company, Detroit, Mich., is having plans prepared for the erection of an addition to the company's plant.

Rauch & Lang's Addition—The Rauch & Lang Carriage Company, Cleveland, O., builder of electric automobiles, will erect a large addition to its plant.

Prest-O-Lite Enlarges—The Prest-O-Lite Company, Minneapolis, Minn., has bought property 80 feet by 336 feet in St. Paul, Minn., for $8.000, and will enlarge.

Julian Company Builds—The Julian Motor Company, Syracuse, N. Y., has commenced construction of its new plant for the manufacture of automobile engines and marine motors.

Detroit Company's Plant—The Parish Manufacturing Company, Detroit, Mich., manufacturer of automobile frames, has awarded a contract for the erection of a brick addition to its plant.

Buckeye Company's Addition—The Buckeye Rubber Company, Akron, O., will soon start the erection of a one-story brick and concrete addition to its factory, which will be 40 feet by 120 feet.

Moon's 1912 Additions—In the past season many additions were made to the factory of the Moon Motor Car Company, St. Louis, Mo., increasing its capacity 65 per cent. Further additions are now being made and a very great amount of new machinery is being installed.

Walloff Establishes Plant—The Walloff Motor Truck Company, Minneapolis, Minn., in consideration of receiving a free site and free gas, has undertaken to establish a plant at Redcliff, Alta., for the manufacture of motor trucks and automobiles. The main building will be 60 feet by 150 feet.

Willard Company Buys—The Willard Storage Battery Company, Cleveland, O., has purchased the real estate and three-story brick and stone building formerly occupied by the Frost Wire Fence Company of that city. The building affords the company 50,000 additional square feet of space.

Vinot's Montreal Plant—A site has been selected in the east end of Montreal, Can., by the Vinot Car Company of Canada, and it is expected that it will be possible to turn out the finished product in the spring. The local company has a working agreement with the Vinot Car Company of France and will be helped materially through this connection.

Ford's Scientific Management—Revolutionary steps along the line of scientific management of its factory are being taken by the Ford Motor Company, Detroit, Mich. It is striving to eliminate every waste motion of its employees and all superfluous space in its buildings. Its latest move toward that end is the abandonment to a large extent of its storerooms.

Ford's Walkerville Progress—The Ford Motor Company, Walkerville, Ont., has more than doubled its production each year since 1909. The plant is being greatly enlarged. A big gas producer engine is being installed, the machine shop is being increased and every other department is being increased in proportion. This is being done to take care of the estimated production of 15,000 cars for the coming year.

Kelly Enlarges Plant—The Kelly Motor Truck Company, New York City, has been refinanced with a capital stock of $4,000,000, which means the enlargement of its plant.

Packard Building Addition—The Packard Motor Car Company, Detroit, Mich., is erecting a new factory building at its plant on Harper street and the Boulevard.

Mathiesen Company's Plant—The Mathiesen Spring Cushion Wheel Company, San Antonio, Tex., will install a plant at that city for the manufacture of spring cushion automobile wheels.

Plans Accessory Factory—The Ernest Lee Machine Company, Cleveland, O., has plans for an automobile accessory factory to cost $15 000. It is to be one story high, of brick and 100 feet by 320 feet.

Cheverlot's Flint Addition—The Cheverlot Motor Company, Detroit, Mich., has secured a site in Flint, Mich., and will erect a factory for the manufacturing of automobile bodies, to cost $50,000.

Hall's $17,000 Addition—The C. M. Hall Lamp Company, Detroit, manufacturer of automobile lamps, has taken out a building permit covering the erection of a two-story addition to its plant to cost $17,000.

Ross & Young's Plant—The Ross & Young Machine Company, Detroit, Mich., has acquired a site 100 feet by 200 feet, and will, it is stated, erect a new factory. The company manufactures automobile engines.

Wheel Company's Factory—The Ideal Steel Wheel Company, Cincinnati, O., makers of a new automobile wheel, will close a deal for a factory within a very short time. The transaction will involve about $30,000.

Oakland Makes 11,500 Cars—The Oakland Motor Car Company, Pontiac, Mich., plans to make 11,500 cars for 1913, necessitating a number of factory additions. A total of 300,000 square feet of space will be added.

Poppenberg's Seven-Story Building—The Poppenberg Motor Car Company, Buffalo, N. Y., has completed plans for the construction of a seven-story building at the corner of Main and Carlton streets, that city.

Building New Car—A. G. Bayerline has secured manufacturing space in the plant of the King Motor Car Company, Detroit, Mich., where he is at work on the car which he will shortly introduce to the automobile world.

Electric Company Starts—The new factory building and sales branch of the Buffalo, N. Y., Electric Vehicle Company were formally opened recently. Electric roadsters and coupés equipped with wire wheels were on exhibition.

U. S. Tire Company Busy—All of the United States Tire Company's plants will be operated during the coming winter on full summer schedule. This means that they will be run night and day, three shifts of workmen being employed.

General Vehicle Builds—The General Vehicle Company, Long Island, N. Y., manufacturers of automobiles, is receiving bids for the construction of a new factory, to be six stories high and 327 feet by 75 feet. The estimated cost is $50,000.

Factory in Hyde Park—The Lenox Motor Car Company, Boston, Mass., has increased its business so that it has outgrown its present quarters in Boston, and so a factory has been secured at Hyde Park, Mass., in which to build the product, the Boston plant being used as a service station for Lenox owners.

Inaugurate 9-Hour Workday—The Aluminum Castings Company has inaugurated a 9-hour workday schedule at its Manitowoc, Wis., plant, which is devoted to the manufacture of castings for the automobile industry. The wage schedule has been changed so that employees receive wages equal to a 10-hour workday rate.

Tire Factory in St. Louis—A rubber tire manufacturing plant, to be a new industry in St. Louis, Mo., soon will be started. The concern, to be known as the St. Louis Tire and Rubber Company, will be organized in the near future. It will be capitalized at $150,000. A site for the plant already has been chosen and work will be begun as soon as possible.

Marathon's New Factory—The Marathon Tire & Rubber Company, Cuyahoga Falls, O., was recently organized for the manufacture of tires, inner tubes and a general line of rubber goods. A building is now under construction which will be 65 feet by 300 feet, and machinery will be installed as soon as possible with the expectation of beginning operations November 1.

Buy Axle Works—Thomas Walker and Superintendent Weiss, of the Weston-Mott Company, Detroit, Mich., and other associates have bought the Flint Axle Works and the firm name will be changed to the Walker-Weiss Axle Works. They will enlarge the facilities of the plant for the manufacture of automobile axles.

Rands Buy Factory—The Rands Manufacturing Company, Detroit, Mich., maker of automobile equipment, has purchased from the Pfauder Realty Company, Rochester, N. Y., the plant located at Fort and St. Antoine streets. The plant is about two-thirds the size of the fa tory now occupied by the company and will be operated as an addition to the present plant. The very latest equipment will be installed in the factory.

KisselKar Adds Plant—The Kissel Motor Car Company, of Hartford, Wis., has acquired the former Romadka trunk works on Center street, between Thirty-first and Thirty-second streets, Milwaukee, Wis., and is now converting the plant into a motor car factory which will serve as a branch of the big KisselKar works in Hartford. The Romadka Bros. Company, up to the time of its failure last spring, owned and operated one of the largest trunk and bag manufa tories in the United States, having more than 200,000 square feet of floor. Frank J. Edwards, manager for the Kissel company, states that it is proposed to use the Milwaukee branch for the production of two complete Kisselkar models.

Visit of the Milwaukee Merchants and Manufacturers Association to the plant of the Kissel Motor Car Company, Hartford, Wis.

Calendar of Coming Automobile Events

Shows, Conventions, Etc.

Jan. 2-10.....New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11.....Cleveland, O., Annual Automobile Show.
Jan. 4-11.....Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-25.....New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.....Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8.....Chicago, Ill., Annual Automobile Show.
Feb. 10-15.....Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15.....Ottawa, Ont., Annual Automobile Show.
Feb. 17-22.....Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....St. Louis, Mo., Annual Automobile Show.
March 3-8.....Pittsburgh, Pa., Annual Automobile Show.
March 8-15.....Boston, Mass., Annual Automobile Show.
March 17-22.....Buffalo, N. Y., Annual Automobile Show.
March 19-26.....Boston, Mass., Annual Truck Show.
March 24-29.....Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Oct. 19.....Track, Brighton Beach, N. Y., Motor Dealers' Exhibit Company.
Oct. 19.....Salem, N. H., Track Races, Rockingham Park.
Oct. 19.....Narberth, Pa., Track Races.
Oct. 19.....Fort Smith, Ark., Ft. Smith-Van Buren Automobile Club.
Oct. 21-25.....Reliability Run, Chicago Motor Club.
Oct. 24-26-27.....Track—San Antonio, Tex., San Antonio Auto Club.
Oct. 26.....Track—York, Pa., York Motor Club.
Oct. 26-28.....Los Angeles to Phoenix Road Race, Maricopa Auto Club.
Oct. 31.....Track—Phoenix, Ariz., Maricopa Auto Club.

Proposed Contests

Oct. 19.....Hartford, Conn., Races, E. W. Powell.
Oct. 26.....Track—White Plains, N. Y., Geo. T. Long.
Nov. 3-5-6.....Track—Shreveport, La., Shreveport Auto Club.
Nov. 15-16.....Track—Richmond, Va., Richmond Automobile Club.
Nov. 28.....Road Race—Visalia, Cal., W. H. Lipton.

The Chinese are beginning to yield to the lure of the American automobile. Two Overland cars arriving at Tientsin

AMERICAN Cars Abroad—Automobiles built in the United States are being shipped into every civilized country of the world. Even inhabitants of the Celestial Kingdom are becoming converts to the American machine and numbers are driving about in them at the present time. The above photograph shows the arrival of two Overland cars at Tientsin, China.

The Rittenhouse-Winterson Company, Baltimore, Md., has moved to new and larger quarters at 602 Water street.

Prest-o-Lite in Toronto—The Prest-o-Lite Company, Indianapolis, Ind., has opened a branch in Toronto, Ont.

Elmer Resigns—H. A. Elmer, president and general manager of the Grant Motor Car Company, Indianapolis, Ind., has resigned. His future plans have not yet been divulged.

Salisbury Pathfinder Manager—H. G. Salisbury, for the past few months sales manager of the Pathfinder Motor Car Company, Los Angeles, Cal., has been appointed general manager of that concern.

Baltimore's City Garage—Mayor Preston of Baltimore, Md., and the other city officials are working on a plan to establish a central city garage for storing all motor vehicles used by the municipality.

Imperial's Frisco Branch—The Imperial Automobile Company is the latest motor car manufacturer to establish a factory branch in San Francisco, Cal. G. A. Troutt will take over the Imperial interests for the entire Pacific Coast.

Purchase Tire Branch—Fred L. Harveycutter and Thornton Chesley have purchased the branch business of the Kelly-Springfield Tire Company, Washington, D. C., and will conduct it under the name of the Kelly-Springfield Tire Company.

Waite Manages Reeve Company—H. C. Waite, formerly factory manager of the G. & J. Tire Company, Indianapolis, Ind., has been appointed general manager of the Reeve Company, Providence, R. I., which concern is another subsidiary of the U. S. Rubber Goods Company.

Ordinance Strictly Enforced—The police department of Columbus, O., has issued notice that the ordinance recently enacted by the City Council providing that all automobiles must come to a full stop while passing street cars discharging passengers will be strictly enforced.

Maxwell in Toronto—The Maxwell-Stoddard Ontario Company is one of the new firms entering the automobile field in Toronto, Ont. This concern, which is the Ontario distributer for the United States Motor Company, handles the Maxwell and Stoddard-Dayton cars in Ontario.

Baltimore's Show Appointments—Messrs. John S. Bridges, Thomas G. Young, Joel G. Nassauer and Secretary H. M. Luzius has been appointed by the Automobile Club of Maryland as committee to make arrangements for the annual automobile show to be held this winter in Baltimore, Md.

Nurse Receives Automobile—The gift of an automobile to Miss Florence Charters, visiting district nurse for the Hospital for Sick Children, Albany, N. Y., permits her to make from twenty-five to thirty daily trips, whereas by street car and walking she could visit only twelve patients a day.

Hoosier Elect Officers—Officers have been elected for the Hoosier Motor Club, Indianapolis, Ind., for the ensuing year as follows: James L. Gavin, president; Joseph R. Raub, treasurer, and W. S. Gilbreath, secretary. George Ade, the humorist, and Harold Taylor have been elected honorary members of the club.

Tire Regulations Extended—The regulations of the Treasury Department of April 22, 1912, providing for the allowance of drawback on tire treads known as Woodworth's treads, manufactured by the Leather Tire Goods Company, Niagara Falls, N. Y., in various sizes, have been extended to cover tire treads 26 by 2½, manufactured by the same company, with the use of imported hard rivets.

Boston Club Needs New Quarters—The members of the Massachusetts Automobile Club, Boston, Mass., the oldest motor organization in the Bay State, are trying to decide what to do about new quarters. The club has outgrown its present building on Boylston street and because of lack of room there is a long waiting list of prominent motorists who would like to join the club and use the garage, which is regarded as a model of its kind.

Essenkay in Houston—The Essenkay Sales Company has established an office in Houston, Tex., with H. H. Hassel as manager.

Road Bureau Established—A bureau of information has been established in Tacoma, Wash., and it is proving of great value to the touring public.

Establishes Milwaukee Auto Mart—The Auto Mart of Chicago, Ill., has established a branch at Milwaukee, Wis., with headquarters at 301-303 Watkins building.

Establishes Repair Shop—F. O. Morse has established a salesroom, garage and repair shop at 386 Brady street, Milwaukee, Wis., and will be distributor for the Crawford.

Studebaker's Mail Car—The Studebaker Corporation, South Bend, Ind., has put a test car on trial in collecting mail in Minneapolis, Minn. Services are to be given free for 60 days.

Alabama's Road Delegates—With the assembling of over 1000 delegates in Birmingham, Ala., last week at the state good roads convention, this state claims to be first in the South in good roads activity.

Lozier in St. Louis—The St. Louis Lozier Company, St. Louis, Mo., organized to take the agency for the Lozier line in that territory, has opened salesrooms in that city. Nelson S. Gottshall is in charge.

Stearns Shipments Increased—Statistics taken in July, August and September, 1912, show the shipments of the F. B. Stearns Company, Cleveland, O., to have increased 100 per cent. over the preceding year.

Does Wisconsin Business—The Galena-Signal Oil Company, a Pennsylvania corporation, capitalized at $10,000,000, has filed articles and a statement to do business in Wisconsin. The local interest is given at $10,775.

Clemens Enters Retail Business—J. Stanley Clemens, for a long time manager of the Portland, Ore., branch of Chanclor & Lyons, accessory dealers, has resigned and will enter the retail automobile business in Portland.

Ohio Affairs—The Ohio Motor Car Company, Cincinnati, O., for which a receiver was recently appointed, is being operated under the jurisdiction of the court. Every indication points to the fact that the company will be reorganized at an early date.

Changes in U. S. Tire—The following changes will take place in the United States Tire Company, Tacoma, Wash.: H. A. Farr will become manager of the Seattle branch October 1; C. H. Mayer will be promoted to the managership of the Portland, Ore., branch.

Promoting Highway Construction—An association has been formed at Lemmon, S. D., to promote construction of a highway from the twin cities to Yellowstone Park, a continuation of the Parmley road which is being built from Aberdeen to Mobridge.

Form Tire Partnership—A Weisskopf, state agent for the O'Neil Tire Protector Company, Milwaukee, Wis., and Oscar L. Bland, a well-known accessory and car man, have formed a partnership and established a general accessory and supply store in that city.

San Benito's Registration—It is claimed that no community in the United States has a greater number of automobiles for its population than San Benito, Tex. The population of San Benito is little more than 3,000 and the number of automobiles owned by the people there is 127.

Loomis Leaves Truck Business—F. L. Loomis, of Minneapolis, Minn., has left the truck manufacturing business and is looking for a line of trucks and pleasure cars. T. F. Robinson will continue the former business, which was the Robinson-Loomis Motor Truck Company, building the Gopher truck.

Alabama Receives $64,489—With the completion of Alabama's fiscal year, October 1, it is found that $64,489 was paid into the state's treasury for automobile licenses. The expense of operating the department was $9,673.35. About half of the remainder, $24,434.90, was devoted to the improvement of roads.

Fire in Specialty House—The Aluminum Specialty Company, Sixth and York streets, Manitowoc, Wis., sustained a loss by fire last week when a back fire in a gasoline engine which was being primed for starting, ignited a gasoline container, causing an explosion. The resulting fire caused only a slight inconvenience.

Error Corrected—In a recent issue an item appeared stating that the residents of Glens Falls, N. Y., addressed a petition to Governor Dix protesting against the acceptance of the new state road between Lake George and Glens Falls, and that the state executive had given assurance that the road would not be accepted until investigated. This was an error as a resident of Glens Falls states that the road had already been accepted without the Governor's knowledge.

New Automobile Agencies

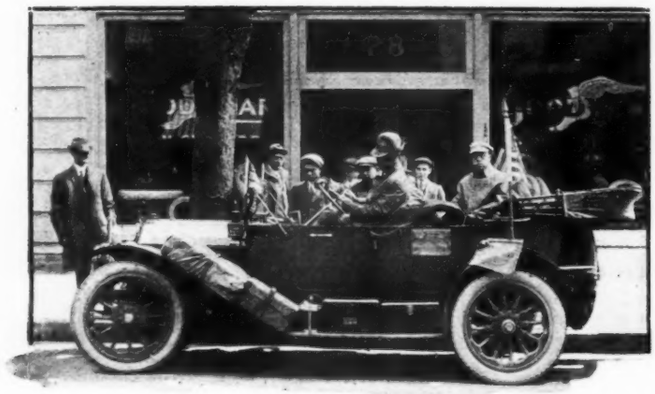
PLEASURE CARS

Place	Car	Agent
Columbus, O.	Chalmers	Broad-Oak Auto Co.
Columbus, O.	Paige-Detroit	Broad-Oak Auto Co.
Columbus, O.	Pierce-Arrow	Broad-Oak Auto Co.
Hamilton, O.	Buick	Hamilton M. C. Co.
Lancaster, O.	Empire	Mattox M. C. Co.
Lancaster, O.	Mitchell	Mattox M. C. Co.
Lima, O.	Henderson	Griffith A. S. Co.
Kokomo, Ind.	Franklin	Dr. J. H. Carnelly
New Orleans, La.	Franklin	Myatt-Dicks Motor Car Co.
North Platte, Neb.	Franklin	J. S. Davis Auto Co.
Ottawa, Ont.	Mitchell	Stanley & Morris
San Francisco, Cal.	Perfex	A. D. Perkins
Spokane, Wash.	Detroiter	Spokane Taxicab Co.
Spokane, Wash.	R-C-H	L. W. Gilmore
Spokane, Wash.	Marion	L. E. Crowell & H. Burgess
Syracuse, N. Y.	Buick	M. H. Granger
Syracuse, N. Y.	Overland	O. T. F. Fitzpatrick
Toronto, Can.	Rambler	C. A. Finzel
Vernon, Can.	Winton	W. R. McGraw
Victoria, B. C.	Franklin	G. Harold Grant
Washington, D. C.	Columbia-Knight	Dupont Gar. Co.
Washington, D. C.	Hudson	Dupont Gar. Co.
Washington, D. C.	Little	Henderson-Rowe Auto Co.
Washington, D. C.	Stutz	The Miller Co.
Winnipeg, Can.	Reo	P. F. Plews

COMMERCIAL CARS

Boston, Mass.	Atlantic	C. D. Daly
Toronto, Can.	Lippard-Stewart	W. T. Butler
Vancouver, B. C.	Dayton	O. J. Fox

This car, an Overland, dashed over a 50-foot embankment at Houston, Tex., and sustained only a slight bend in one front fender. The machine was hoisted to the street with a derrick, refilled with gasoline and driven to the salesroom



A. L. Westgard in his official Pathfinder car starting from the New York branch of the Goodyear Tire & Rubber Company on his Midland Trail through Philadelphia, Reading, Harrisburg, Chambersburg, Pittsburgh, Columbus and Dayton to Indianapolis; thence to St. Louis

Forsyth with Thomas—R. L. Forsyth has been appointed sales manager of the Thomas Flyer Company, San Francisco, Cal.

Hyde with Empire—Harlow Hyde, late of the Cole Motor Car Company, Indianapolis, Ind., has been made advertising manager of the Empire Automobile Company, Indianapolis.

Denniston District Manager—E. E. Denniston has been appointed by the Stewart Motor Corporation, Buffalo, N. Y., manager for the district covering the states of Illinois, Iowa and Missouri.

New Atlanta Swinehart Manager—A. L. Talbott has been appointed manager of the Atlanta, Ga., branch of the Swinehart Tire & Rubber Company, Akron, O., succeeding C. E. Homes, who has resigned.

MacNab with Marion—M. D. MacNab has resigned as general manager of the United Motor Chicago Company, Chicago, Ill., to become vice-president of the Marion Motor Car Company, Indianapolis, Ind.

Delegates in Automobiles—No feature of the Tri-State Good Roads meeting at Mammoth Cave, Ky., was more of a success than the idea of inducing the delegates to come in automobiles. The Nashville, Tenn., delegation occupied thirty-two cars.

Carnahan District Manager—A. T. Carnahan, of the Swinehart Tire & Rubber Company, Akron, O., has been appointed district manager in charge of Ohio, West Virginia, Kentucky, western New York, western Pennsylvania and eastern Michigan.

Aid Association Formed—The employees of the Standard Tire & Rubber Company of Boston, Mass., have formed an association called the Standard Tire & Rubber Company Mutual Aid Association for the benefit of its members when they are ill and in need.

Wilby's Canadian Tour—Thomas W. Wilby and F. V. Haney, the two transcontinental motorists, who left Halifax, Nova Scotia, on August 27 for Victoria, B. C., in search of an all-Canadian highway from coast to coast, had covered 4,000 miles of the trip and had reached Nelson, B. C.

Organize Insurance Company—A number of automobile owners of Eugene, Ore., have organized a mutual insurance company known as the Oregon Automobile Mutual Fire Association. The object is for mutual protection and relief of the members against loss by fire.

Sells 2,010 Cars—On October 1 the Ford Motor Company closed its fiscal year. The Northwest branch at Seattle, Wash., under the management of R. P. Rice, handled a total of 2,010 machines during the 12 months beginning October 1, 1911, compared with 875 cars sold in 1911.

Baltimore Motorists Indignant—Baltimore, Md., motorists are indignant at the proposed scheme of Mayor Preston to pass an ordinance imposing a local license on automobiles. They declare it would be triple taxation, as they now pay the highest registration fee of any state in the Union, and in addition they pay personal tax on their cars up to their fullest value.

Bosch Prizes Awarded—The Bosch Magneto Company, New York City, has distributed its prizes to the Vanderbilt Cup and the Grand Prize winners whose cars were Bosch-equipped. De Palmo, winner of the Vanderbilt, received $200, while Bragg, winner of the Grand Prize, received $500. Second and third places were awarded $100 and $50, respectively, in the Vanderbilt Cup, while second place in the Grand Prize received $200.

Sales in Australia—Canadian motor cars are having a large sale in Australia. About a tenth of the cars in use in the commonwealth are of Canadian make. The Canadian trade commissioner in Australia reports that in Victoria there are registered 447 cars of Canadian make. New South Wales has 376, South Australia 203 and 75 in Tasmania. One hundred additional cars have just arrived from Montreal, Que. The competition, he reports, is very keen.

Dallas Has Motordrome—Dallas is to have the largest motordrome in the world. The contract for the same was closed recently and calls for an expenditure of more than $40,000. The track will be a .25-mile saucer around which will be placed thousands of seats for the public. The company backing the enterprise is composed of such men as Louis Nicolaus, Edward Magnus, E. L. Winterman, J. S. Arthur, Louis Nolker and A. E. Koener, of St. Louis, Mo.

Automobile Ordinance Modified—The Chicago, Ill., ordinance which prohibits automobiles passing street cars which have stopped at crossings to take on or let off passengers has been modified by the City Council which recently amended the regulations so as to include all vehicles. A test case had been threatened by motorists who claimed class legislation and the city fathers, rather than risk having the law wiped off the books, made the change, which, it is thought, will make the clause ironclad.

Indianapolis Patrol Mileage—An interesting report of the mileage of motor cars used in the Indianapolis, Ind. police department during 1911 has just been filed with the board of public safety by Martin J. Hyland, chief of police. The two Packard patrol wagons covered 23,868 miles in 7,249 runs, carrying 9,139 prisoners to the police headquarters, 1,804 prisoners to the workhouse and 165 prisoners to the woman's prison. The Premier touring car used for emergency runs made 1,978 runs, carrying 401 prisoners and making a total to 12,542.1 miles. The total cost of gasoline, oil and maintaining the three machines, exclusive of the drivers' salaries, was $3,927.60.

Automobile Incorporations

AUTOMOBILES AND PARTS

CANAL DOVER, O.—S. Toomey Company; capital, $60,000; to manufacture and sell automobiles. Incorporators: R. I. Toomey, S. J. Brister, Theodore Williams, M. C. Toomey, Oliver Toomey.

CLEBURNE, TEX.—Cleburne Motor Car Manufacturing Company; capital, $10,000; to manufacture automobiles. Incorporators: H. E. Luck, W. P. Ball, Brown Douglas.

DETROIT, MICH.—Detroit Motor Chassis Company; capital, $25,000; to manufacture automobile chassis. Incorporators: J. Kinucan, J. L. Stringer, William P. Culver.

ELYRIA, O.—Elyria Auto Sales Company; capital, $10,000; to sell automobiles. Incorporators: W. C. Bennett, F. S. Bates, Correl Smith, J. J. Dillon.

JACKSON, TENN.—Jackson Motor Car Company; capital, $5,000; to manufacture automobiles. Incorporators: H. C. Gillespie, H. D. Canfield, E. L. Bowne, W. H. Weakley, W. C. Sandifeur.

MORGANTOWN, W. VA.—City Automobile Company; capital, $4,800; to manufacture automobiles. Incorporators: J. Leonard Yates, B. S. Dearing, N. B. Yost, Margaret Smith, Cora B. Dearing.

NEW YORK CITY.—Auto Bankers, Inc.; capital, $5,000; to sell automobiles on credit. Incorporators: Clyde E. Block, J. Lester Fierman, Samuel W. Schwartz.

NEW YORK CITY.—R. H. Conty & Company; capital, $2,500; to manufacture and sell motors, parts, etc. Incorporators: R. Henry Conty, M. Conty, Emil Frankel.

NEW YORK CITY.—Grant Six Company; capital, $15,000; to engage in the automobile business, etc. Incorporators: Clarence P. Hulst, William G. Miller, James B. Speyer.

NEW YORK CITY.—Kammer Automobile Company; capital, $10,000; to engage in the automobile business. Incorporators: Max A. Kammer, Frances Kammer, William Magsamen.

ROCK HILL, S. C.—McFadden Auto Company; capital, $3,500; to manufacture automobiles. Incorporators: V. B. McFadden, D. B. McFadden.

GARAGES AND ACCESSORIES

DETROIT, MICH.—Merralls Starter Company; capital, $150,000; to manufacture gasoline engine starters and other automobile accessories. Incorporators: William A. Merralls, Robert S. Neely, Harlow B. Lowland.

GOLDSBORO, N. C.—Blackburn Garage & Motor Supply Company; capital, $25,000; to conduct a garage and deal in accessories. Incorporators: H. C. Smith, M. M. Allen.

HOPKINSVILLE, KY.—Hopkinsville Cadillac Company; capital, $10,000; to conduct a general automobile and garage business. Incorporators: R. E. Cooper, T. W. Blakey, Odie Davis, Richard Levell, E. G. Peterson.

JEFFERSON CITY, MO.—Shackelford Garage Company; capital, $2,000; to engage in the garage business. Incorporators: Addison Shackelford, L. E. Shock, Paul Gee.

Shell Road to Be Restored—The shell road around Mobile Bay, Mobile, Ala., the most famous driveway in Alabama, is to be restored.

Forsyth Salesman Thomas—R. L. Forsyth has been appointed sales manager of the Thomas Flyer Company of San Francisco, Cal.

Van Deusen Resigns—Walter H. Van Deusen, assistant general sales manager of the Abbott Motor Company, Detroit, Mich., resigned Oct. 1.

New Service Station—The Pope Hartford Company, Boston, Mass., has leased a large building on Heywood street, Cambridge, for use as a service station.

Stevens Transferred to Denver—Sam A. Stevens, representative of the Rauch & Lang Electric Company, has been transferred to the Denver branch of the company's business.

Construct Municipal Garage—The Rochester, N. Y., common council adopted last week an ordinance authorizing the construction of a municipal garage and stable to cost $30,000.

Shanks Made Sales Manager—The Kelly Motor Truck Company, Springfield, O., announces the appointment of Charles B. Shanks, formerly of the Winton, as sales manager.

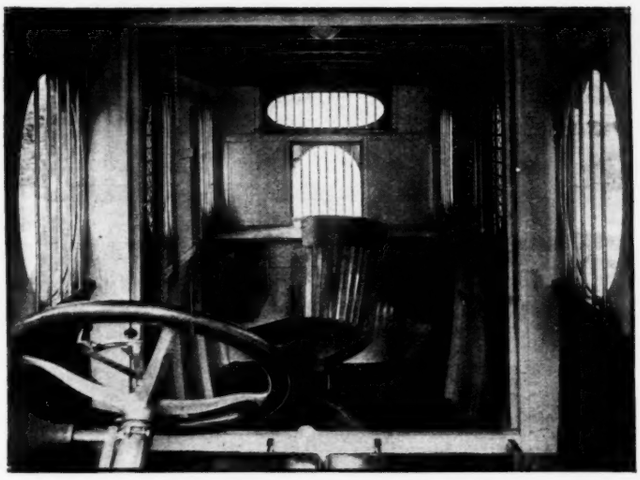
Federal Opens Frisco Branch—The Federal Rubber & Manufacturing Company will shortly open a factory branch in San Francisco, Cal., which will be in charge of L. L. Rettig.

Hickman Representing Stevens-Duryea—S. E. Hickman has been appointed by the Stevens-Duryea Company special representative for the Buffalo, N. Y., territory, with offices in the Hotel Lafayette.

Budd with Sanford—J. G. Budd, manager of the Victor Motor Truck Company, Buffalo, N. Y., has resigned to become general sales manager of the Sanford Motor Truck Company, Syracuse, N. Y.

Hall President Salisbury Company—Frederick P. Hall has been elected president of the Salisbury Wheel & Manufacturing Company, Jamestown, N. Y., succeeding Scott M. Penfield, who becomes sales manager and vice-president.

Martin Manager Buick—Robert H. Martin has been appointed manager of the Buick Motor Company's branch, Washington, D. C., succeeding T. S. Johnston, who has been made Eastern sales manager of the Republic Motor Company.



Interior of the bank on wheels now used by the city paymaster of Detroit, Mich. It is fitted up inside like a regular office which can be locked securely to prevent robbers from reaching the money. It is mounted on a Cartercar chassis

Automobile Incorporations

MUSKEGON, MICH.—W. W. Butterfield & Company; capital, $10,000; to manufacture a self-starting device for automobiles.

NEW YORK CITY.—Automobile Information Publishing Company; capital, $10,000; to print and publish automobile trade lists. Incorporators: Albert F. Britton, Robert B. Johnston, Freeman C. Britton.

NEW YORK CITY.—Central Park Garage Company; capital, $500; to engage in the garage business. Incorporators: William E. Young, George J. Johnstone, Charles A. Frueauff.

NEW YORK CITY.—Motometer Company; capital, $5,000; to manufacture devices for automobiles, etc. Incorporators: George H. Townsend, Harrison H. Boyce, Frederick J. Moses.

NEW YORK CITY.—Never Skid Manufacturing Company; capital, $50,000; to manufacture non-skid devices for automobiles, tires, etc. Incorporators: Daniel E. Wing, George L. Lewis, Charles H. Stanton.

NEW YORK CITY.—Perfection Automobile Body Company; capital, $15,000; to manufacture and sell automobile bodies and appliances. Incorporators: William H. Mendel, William H. Mendel, Jr., James V. Simpson.

NEW ORLEANS, LA.—Ezeride Filler Company; capital, $1,000,000; to manufacture a tire filler. Incorporators: Ruffin R. Barrow, Gordon S. Orme, John H. Fulton, J. F. Anderson, Daniel D. Curran, Harry H. Osborn, J. Blanc.

SHERBROOKE, QUE.—Canada Tire Filler Company; capital, $150,000; to manufacture a tire filler.

ST. LOUIS, MO.—Auto Products Company of America; capital, $25,000; to manufacture, buy, sell and deal in chemicals, polishes, compounds, cements and automobile accessories. Incorporators: Warren W. Smoot, Eugene B. Stinde.

ST. LOUIS, MO.—St. Louis Motor Transportation Company; capital, $25,000; to conduct a transportation business. Incorporators: William R. Busch, Frank J. Busch, Knox Taussig.

YOUNGSTOWN, O.—Youngstown Taxi-Cab Company; capital, $10,000; to operate and maintain a taxicab business together with a garage. Incorporators: David Friedman, Sadie Friedman, Harris Friedman, Helen Friedman, Bert Friedman.

CHANGES OF NAME AND CAPITAL

CANTON, O.—Knight Tire & Rubber Company; increase of capital from $500,000 to $1,500,000.

CLEVELAND, O.—Cadillac Automobile Company; name changed to Cleveland Cadillac Company.

DETROIT, MICH.—M. & P. Electric Vehicle Company; increase of capital from $50,000 to $100,000.

JACKSON, MICH.—Clarke-Carter Automobile Company; name changed to Cutting Motor Car Company.

MUSKEGON, MICH.—Continental Motor Manufacturing Company; increase of capital from $500,000 to $2,400,000.

NEW YORK CITY.—Wrights' Garage; capital, $2,000; to engage in the garage business. Incorporators: William R. Dickie, Earl D. Wright, Elizabeth D. Wright.

Dallas to Get Big Motordrome—A contract for a $40,000 motordrome to be built in the city of Dallas, Tex., has just been closed. The track will be one-quarter mile long and built as a saucer around whose circumference the grandstand will be arranged.

Northwestern Cole Company Formed—The Northwestern Cole Motor Company, 219 Sixth street, Minneapolis, Minn., has been formed to handle the northwest distributing business of the Cole Motor Car Company of Indianapolis, Ind. H. P. Wood is president and general manager.

Midland Changes—J. D. Beebe has been appointed general manager of the Midland Motor Company, Moline, Ill., succeeding Frank B. Wood. F. A. Padgett has been made sales manager. The company will build a 60-horsepower, six-cylinder car which will be fitted with a Wisconsin motor.

Gamble Company's New Quarters—The Gamble Motor Car Company, Toledo, O., is constructing a new building which together with its old quarters will increase its establishment to the size of one-fourth city block. The new construction will be of brick and steel, the floors being made of concrete.

Ford Joins Goodyear—J. A. Ford, of the Cleveland, O., Mechanical Rubber Company, has resigned his position as superintendent to join the forces of the Goodyear Tire & Rubber Company, Akron, O., where he has accepted a position in the experimental department in connection with mechanical goods.

Buffalo Boulevard Opened—The Buffalo-Niagara Falls boulevard, which the Buffalo, N. Y., Automobile Club was instrumental in constructing, will be officially opened for traffic November 15. Sixteen feet of the road is of brick and 16 of improved earth road, the boulevard being 32 feet wide along the entire course.

Highway Engineer Appointed—Owing to the large amount of good roads construction now in progress in Louisiana, a state highway engineer has been appointed, W. E. Atkinson, who will be at the service of all parishes to indicate proper methods of road construction and to see that roads once built are properly protected.

Federal's San Francisco Branch—The Federal Rubber & Manufacturing Company, Milwaukee, Wis., will open a branch in San Francisco, Cal., in the near future. It will be a general distributing depot for the entire Pacific Coast. E. L. Rettig, manager of the solid tire department of the Diamond Rubber Company's branch in that city, has been appointed manager of the new Federal establishment.

Apperson's Annual Meeting—The annual meeting of the stockholders of the Apperson Brothers Automobile Company was held in the offices of the company at Kokomo, Ind., Tuesday, October 8. Elmer Apperson, Edgar Apperson and T. E. Jarrard were elected as directors for the ensuing year. Later, at a meeting of the board of directors, officers were elected as follows: President and general manager, Elmer Apperson; vice-president, T. E. Jarrard; secretary-treasurer, Edgar Apperson.

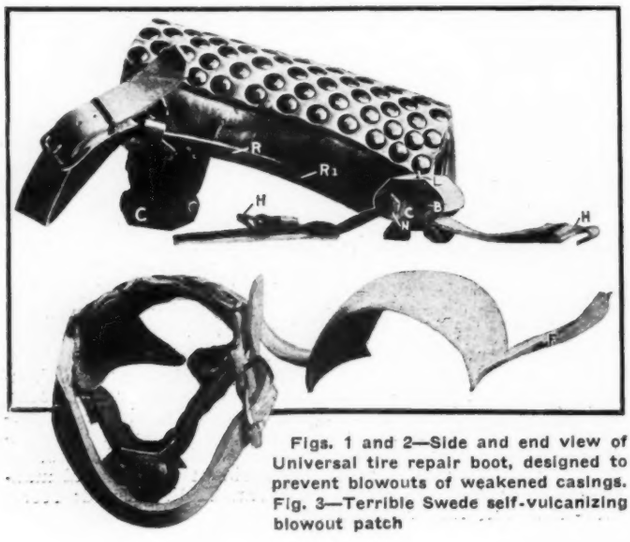
Universal Tire Repair Boot; Star Plug Switch; Automatic Valve Grinder; Wink Anti-Back-Kick Crank; Terrible Swede Tire Patch; Sound Intensifier for Hunting Noises; Rexo Vibrator Signal

Universal Blowout Preventer

On the strength of the fact that one ounce of prevention is better than nine pounds of cure, the Universal Tire Protector Company, Angola, Ind., has brought out a repair boot by means of which threatening blowouts may be prevented. The Universal boot, Figs. 1 and 2, consists of two layers of specially tanned chrome-leather which are secured together by rivets R passing through a malleable iron rim R. The process of tanning the leather renders it so soft and pliable that the two layers easily adapt themselves to the shape of the casing onto which the shoe is applied. The method of securing the shoe to the casing is by means of three straps of the same leather as the boot itself. One of these straps has its two sections fixed to the bead portions of the boot and may be drawn tight by a buckle attached to one end of the strap. The other two straps are also made in halves which are held together by the connecting part C, Fig. 1. The latter is pierced by two bolts B, the heads of which are shaped as nuts N. The bolts carry ratchet wheels which are engaged by pawls secured to the inside casing of the part C. The pawls may be lifted out of engagement with the ratchets by pressing the end of the levers L secured to them and projecting through the casing C. When the nut is turned it winds up the strap half attached to it, both bolts being adapted for this work so that any desired tension put on the straps the hook ends H of which engage the rims R of the boot. The Universal boot is made for tires of 2.5, 3, 3.5, 4, 4.5 and 5 inches section and in the following lengths: 9, 12, 15 and 18 inches. It is furnished either with plain or studded tread, the latter type being designed for use in connection with non-skid tires.

Star Spark-Plug Switch

An accessory by means of which fouled spark-plugs may be easily located is made by the Star Motor Device Company, 1900 Broadway, New York City, is shown in Fig. 7. The switch or tester comprises three parts which are securely fixed together and one tester is permanently attached to each spark-plug through a slot which is punched in the sheet metal part of the device. This slot fits around the top end of the binding post and to it is fastened a channel-bent wire, one end of which is equipped with an insulated grip. The tester is normally in the position shown in Fig. 7, but when the engine begins to miss fire the tester wires of three cylinders are turned down so that the free end of each contacts with the shell of the plug, thereby shorting the current. This procedure is carried out with each three plugs short-circuited, and when the motor stops the cylinder whose plug is not short-circuited is proved to be the missing one. If the switch is then so regulated that the end of the wire is within .03125 inch of the shell and the other cylinders are put in operation, the following observations may be made with the missing cylinder: If a spark jumps between tester wire and shell, the plug is fouled; if no spark occurs the trouble lies in the wiring of the plug, and may be easily detected by following up the conduit leading from the distributer binding post to the plug.



Figs. 1 and 2—Side and end view of Universal tire repair boot, designed to prevent blowouts of weakened casings. Fig. 3—Terrible Swede self-vulcanizing blowout patch

The Automatic Valve Grinder

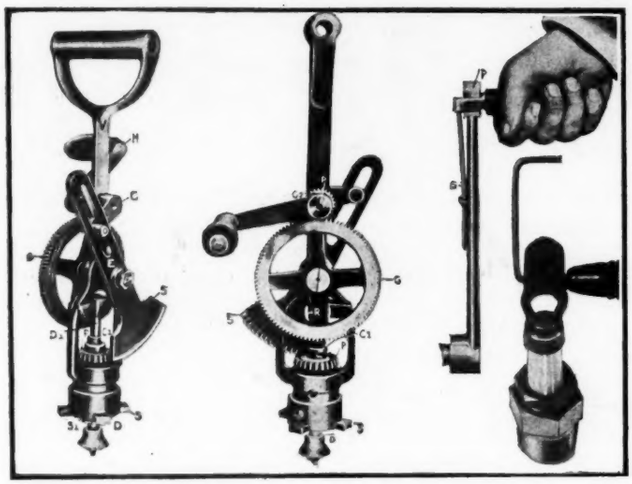
A novel type of valve grinder which has been designed on similar principles as the breast drill is being sold under the name of the Automatic valve grinder by the Specialty Machine Company, 95 Liberty street, New York. In this valve grinder the valve is kept rotating alternately in two directions, being lifted periodically and dropped back on its seat in a different angular position. The principle of operation is easily understood upon reference to Figs. 4 and 5. The device is actuated by turning the handle H of the crank C which is pivoted at P on the support V. The extension E of the segment S is slotted and the end pin of E rotated by the crank C simultaneously reciprocates in this slot and moves the extension from one side to the other. The effect of this motion turns the pinion P alternately in two directions. This pinion P is fixed to the shaft D, which is coupled to the shaft D1 by a clutch C1. The gear G1, mounted on the crank C, also actuates gear G, the inner side of which carries a cam which periodically lifts the roller R. When this occurs the clutch C1 is lifted and the same refers to the shaft H carrying the valve. As soon as the cam has passed under the latter drops and the valve again contacts with the seat, but in a different angular position as before. It is now rotated until the roller is lifted again. In order to permit the use of this valve grinder with the valve of motors of different sizes, the spring S1 is provided which is so adjustable that a greater spring pressure may be used in grinding in a large valve than a small one.

Flat Spring Wink Safety Crank

The legion of safety cranks which forms the missing link between the ordinary crank and the self-starter has been increased by another design. This latest addition is the Wink Crank, Fig. 6, which operates on an extremely simple principle. The handle of this crank is pivoted on the pin P and when the crank is used is in the position shown in Fig. 6. As soon, however, as backfiring occurs in the motor, the reversed rotation of the crank pulls the handle out of the operator's hand, due to the tension of the spring S which holds the handle in the cranking position. In all other ways this crank is constructed like the ordinary type, the inner end being shaped to fit over the keyed end of the crankshaft and acting without the agency of a ratchet joint. This crank is a product of the Wink Crank Company, 2106 Superior Viaduct, Cleveland, Ohio.

Terrible Swede Blowout Patch

A three-ply, 16-ounce fabric blowout patch vulcanized with high-grade Para rubber is being manufactured by the Hagstrom Brothers, Lindsborg, Kans. This patch is shaped to fit the inside of a vulcanized casing and has two flaps F at-



Figs. 4 and 5—Automatic valve grinder. Fig. 6—Wink safety crank, using a flat spring to counteract back-kicks. Fig. 7—Star spark-plug switch for easy locating of misfires

tached to it which fold around the bead of the casing between the same and the rim. It is not necessary in the use of this patch, which is named the Terrible Swede, to vulcanize the same in place in the tire. It merely needs to be inserted in the casing and is there vulcanized by the heat produced in the tire while running. It is made in three sizes.

Detectorphone to Locate Knocks

Locating knocks is no easy work, and to facilitate it the Boston Talking Machine Company, 41 West street, Boston, Mass., has designed the Detectorphone, by means of which sounds may be greatly intensified and their difference easily noted. The device, Figs. 8 and 9, consists of a sound receiver through which sound enters the apparatus, the electric conductor and intensifier, the transmitter and the operator's receiver in which the electric undulations are again transformed into sound. The exterior of the device is seen in Fig. 8, and attention is called to the push-buton P which when depressed closes a circuit and puts the instrument in operating condition. Fig. 9 illustrates the interior construction. The part C contains a coil, the armature of which is contained inside A and is subject to sound vibrations entering by way of the steel rod R when the latter is in place as in Fig. 8. The current is supplied by a dry cell inside the Detectorphone casing, which takes up the space marked on its outside (in the illustration) C1. The undulating current flows from one end of the battery through the coil and the casing of the device, while the other end contacts with a metal screw on the insulated face of the part Q. The end of an insulated wire surrounding this insulated face contacts with the wall of the casing and both wires, which are silk wound, are connected to the operator's receiver, which is held to the ear while the push-button P is pressed.

In the use of this device it is necessary to first become accustomed to the normal sound or sounds of the motor by listening to it at various portions of the power plant. Being once familiar with the characteristic sounds produced by the various parts, automobilists will by a quick inspection of their motor with this device be able to locate a knock positively and with ease.

Rexo Electric Vibrator Horn

The low-priced electric horn has been given another impetus by the action of the Dean Electric Company, Elyria, Ohio who, have brought out the Rexo, Figs. 10 and 11. The principles on which this device is constructed are the same as those that serve in the Tuto horn made by the same company. A steel diaphragm is fixed inside the flanged portion P of the horn casing by six screws S, tightness between the casing and the diaphragm being insured by the use of a circular brass washer consisting of three sections. To the center of the diaphragm a bolt is fixed and when the latter is struck by the vibrating armature of the electric magnet, which constitutes the actuating member of the appartus, the vibrations are imparted to the diaphragm, producing the warning sound which resembles that of the Tuto. The Rexo horn is 11 inches long and the megaphone has a diameter of 6 inches. The horn is finished in brilliant black, with the fittings either nickel or brass colored. The equipment of the horn includes silk-covered cable and a push-button switch.

The mechanism actuating the diaphragm is contained in the horn casing which has two portions P1 and P2, the latter serving as a cap. When P2 is removed, the contact mechanism, Fig. 11, becomes visible. A is the armature of the electric magnet and A1 an adjusting screw for the contact breaker B. The contacts T1 and T2 are insulated from one another, and while from T1 an insulated cable leads directly to one end of the magneto winding, the contact from T2 is through the screw A1, the contact breaker B and the screw S1. When by pressing a button in the circuit the contact is closed the magnetized vibrator coil attracts the armature which has the part B attached to it, thereby interrupting the circuit between B and A1. B, which is a flat steel spring, returns to its original position, and as it closes the circuit the cycle begins over again. The horn comes fully equipped with cable and push-button.

Fig. 8—View of Detectorphone which may be used as a stethoscope in diagnosing the ills of the motor. Fig. 9—Interior construction of the Detectorphone, comprising a coil-and-diaphragm mechanism, similar to a telephone construction. Fig. 10—Side view of the Rexo electric vibrator horn. Fig. 11—Rear end view of Rexo horn, showing the vibrator mechanism and terminals

Patents Gone to Issue

INTERNAL Combustion Motor Valve—Being a sleeve which regulates the passage of gases between the interior of the cylinder and gas passages in the head.

The subject-matter of this patent, a valve mechanism, is illustrated in Fig. 1. An open-ended cylinder C is fitted with a removable head H which incloses its open end and which has admission ports A and exhaust ports E communicating with the interior of the cylinder. A partition P divides the head H in two sections, which are referred to in the patent as admission and exhaust belt. In the cylinder head a sleeve valve V is inclosd, which controls the ports.

No. 1,040,613—to Ernest Windsor Bowen, London, Eng. Granted October 8, 1912; filed November 25, 1911.

Brake Lever Lock—In which the brake lever carries a lock holding a dog in place on a toothed bar.

This patent refers to the combination of a brake lever L which carries a movable dog D adapted to engage a toothed bar B with a fixed abutment in the plane of a portion of the dog D. To enable the brake lever to be locked relatively to the toothed bar, a lock L1 is secured to L, which is fitted with a bolt; the latter may be projected by the working of a key so as to take a position between the dog and the fixed abutment and to engage both.

No. 1,040,844—to Peter F. Augenbraun, Stamford, Conn. Granted October 8, 1912; filed September 9, 1909.

Non-Collapsible Tire—Being a pneumatic design of substantial construction.

In Fig. 3 is shown the pneumatic, non-collapsible tire described in this patent comprising a substantially flat tread portion T and a seat portion. Fabric layers F are permanently embodied in the tire; of these an outer layer O extends down from the tread portion along the sides, while a layer P is arranged parallel with the tread and a third layer C is circular in shape, its office being to give rigidity to the fabric structure. Adjacent to the seat portion of the tire a riding cushion R is located, whose central portion is raised toward the tread portion of the tire. An oppositely disposed interior surface S co-operates with the cushion R.

No. 1,040,920—to Henry G. Fiske, New York City. Granted October 8, 1912; filed July 1, 1899.

Carbureter for Automobile Motors—Working on a multiple-jet principle.

This patent has reference to a carbureter design, Fig. 4, comprising a casing including a reservoir R, with an extension C serving as a carbureter fuel supply chamber concentric to the reservoir and being shaped as an arc. This chamber is connectible to the intake manifold of an engine; it is divided into a number of circular chambers which are connected by leads C1 to the reservoir R and have independent air inlets. In each circular chamber is an independent nozzle and a controller C2 which consists of an inverted cylindrical sleeve valve movable by engine suction.

No. 1,040,414—to George P. Rettig, Richmond, Ind. Granted October 8, 1912; filed September 7, 1910.

Rotary Valve for Combustion Motors—Constructional detail for lubricating a rotating cylinder valve.

The rotating cylinder valve feature described in this patent consists in the use of a channel C, Fig. 5, formed transversely in the seat S of the valve V. In the mouth of that channel a segmental insert I forms a restricted passage R.

No. 1,040,738—to Emil A. Nelson, assignor to Rotary Valve Motor Company, Detroit, Mich. Granted October 8, 1912; filed February 5, 1910.

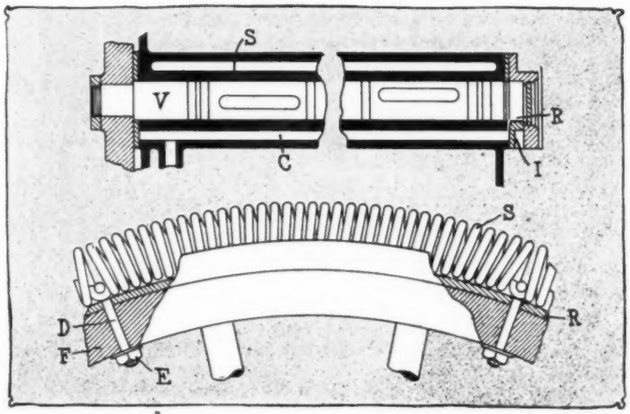


Fig. 5—Nelson rotary valve. Fig. 6—Van Smith spring tire

Automobile Spring Tire—In which resiliency is obtained by the use of coiled springs encircling the rim.

This patent refers to a wheel having a rim R and felloe F, the rim being of the channeled type and containing in its inner portion a coiled spring tire S. The latter consists of a number of coiled springs arranged end to end and terminating in hooks. Between the hooks pass fastening devices D which extend radially through rim and felloe.

No. 1,040,471—to Charles Van Smith, Kansas City, Mo. Granted October 8, 1912; filed September 3, 1910.

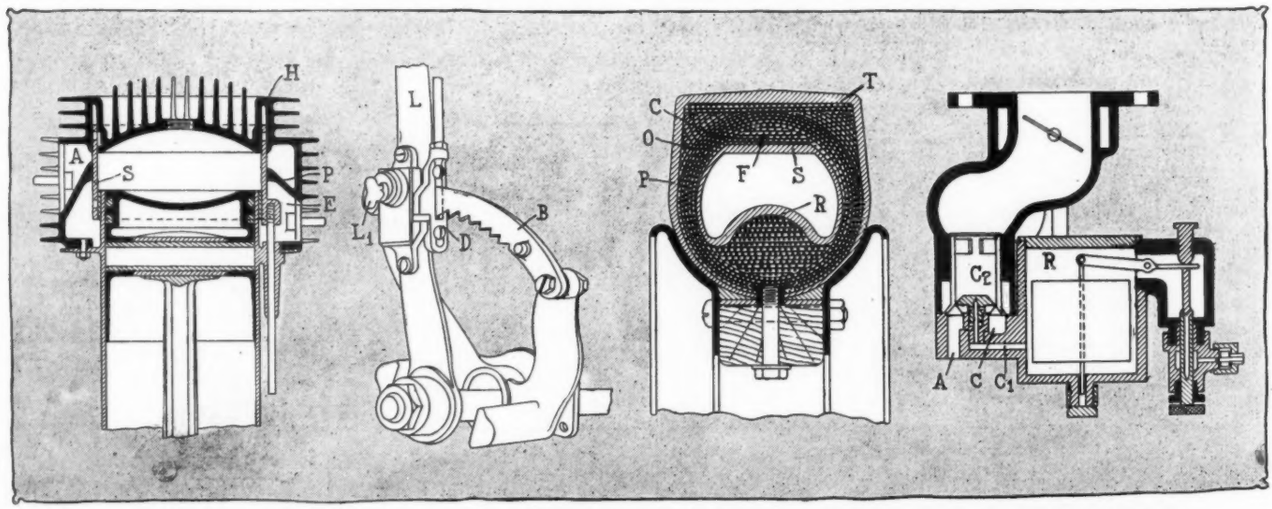


Fig. 1—Bowen sleeve valve. Fig. 2—Augenbraun brake-lever lock. Fig. 3—Fiske tire. Fig. 4—Rettig carbureter